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Special Automobile Issue

TOM McCAHILL LOOKS OVER THE 1956 CARS

MECHANIX ILLUSTRATED

THE HOW-TO-DO MAGAZINE

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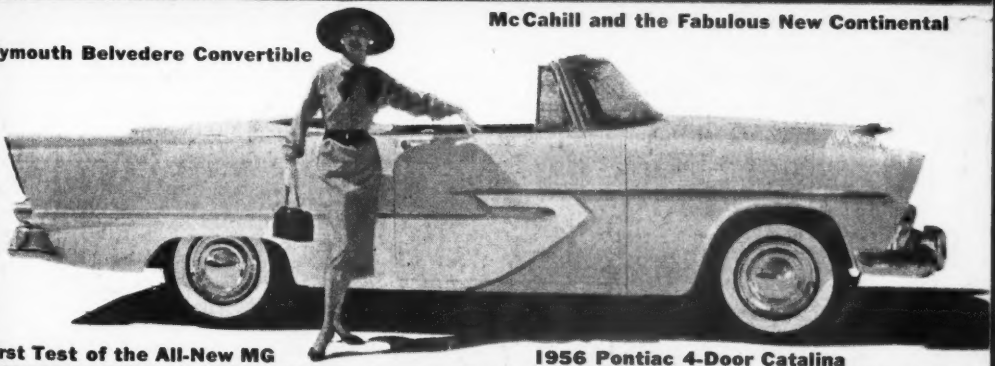
NOV.

McCahill and the Fabulous New Continental

Plymouth Belvedere Convertible



First Test of the All-New MG

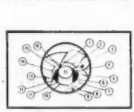
1956 Pontiac 4-Door Catalina

17 pt. Plug shows 11% fuel saving in stock American automobile!

New electrode system still fires clean, hot and steady past 50,000 car miles! You may now order a set of these remarkable LIFE-TIME spark plugs from this advertisement . . .

50,000 CAR MILES! Before LIFE-TIME development, the spark plug was the most often replaced part of your car. Engineers agreed that "creeping paralysis," gradual electrode disintegration, carbon buildup, widening gap, burning, blistering, insulator failure could waste one gallon in ten. The LIFE-TIME plug goes far beyond the life of the average set of tires, the average battery, firing clean, hot and steady at 50,000 car miles! Most spectacular spark plug research breakthrough in 50 years allows unprecedented warranty. WE GUARANTEE GREATER GAS MILEAGE — GREATER ACCELERATION — A MAJOR POWER INCREASE — OR YOUR MONEY BACK.

HOW 17 PT. FIRING WORKS



Note electrodes closely. A circular arcing area (four concave segments). Gap being the same from all points. Electricity has property of arcing from coldest point. Current also arcs more readily from apex of two planes than from face of a flat, metallic surface. Note that there are 16 apexes (where two planes meet) — all the same distance from the center electrode.

SPARK ROTATES AROUND CIRCLE. Normal heat and spark erosion are spread around the entire 360 degrees and around the whole circumference of the center electrode.

PLATONIUM-NICKEL ALLOY ELECTRODES — Metallurgists' first major step beyond platinum aircraft plug electrodes. Arcing points of this material have continued to function after the equivalent of 120,000 car-miles.

SPECIAL SINTERED CORUNDUM INSULATOR — Made of gem-like mineral which conducts heat 20 times better than ordinary porcelain. Special shape (seen beneath electrodes) is designed to vaporize and exhaust wet carbon and oil.

INDIVIDUAL INSPECTION — Each LIFE-TIME Spark Plug is tested for firing in oil and for resistance to 30,000 volts/CM.

PERMANENT GAP — After months of use, LIFE-TIME Spark Plugs mike at exact factory pre-gap.

SELF-CLEANING FOR LIFE — Confined gases exploding in chamber formed by multiple electrodes reclean arcing surfaces with each firing stroke.

"THANKS FOR YOUR WONDERFUL LETTERS"

The real test of a spark plug is "What will it do in my own car?" Take the above dynamometer test on a 1951 Buick Super. It shows an 8 horsepower gain with Life-Time 17-point plugs. That was a 12½% hp gain at 2000 RPM. You don't need a dynamometer with Life-Time Plugs. You can feel the difference both in your ride and your pocketbook. Try a set and let me hear from you about them. Many Thanks.

Frank E. Williams
Inventor of the LIFE-TIME Spark Plug

CONTINENTAL MFG. CORP., CULVER CITY, CALIF.

LIFE-TIME Spark Plug Division
CONTINENTAL MANUFACTURING CORP.
Washington Blvd. at Motor Ave.,
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Model _____ No. cyl. _____

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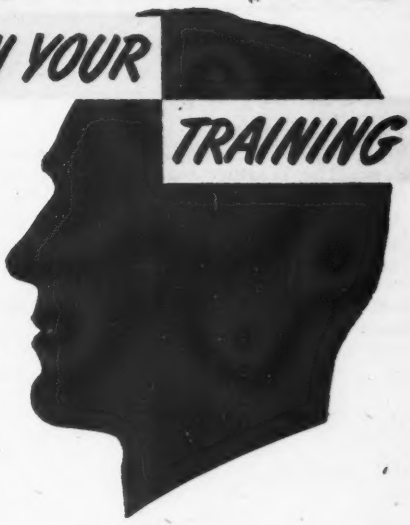

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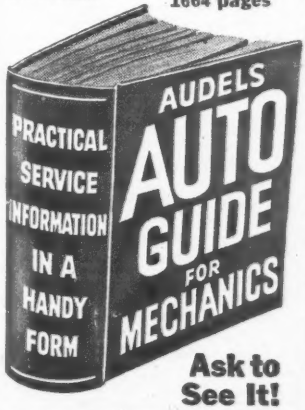

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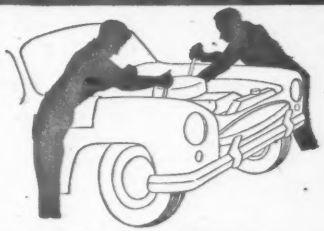

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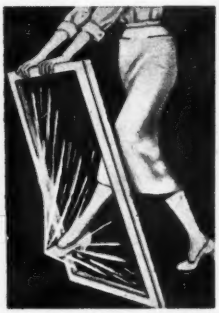

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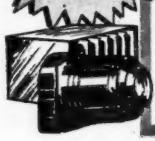

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Build a better future. Get into a field where there is important work and the security that comes from knowing a good trade. The electrical appliance repair business offers OPPORTUNITY FOR YOU. Every wired home today has an average of 8 electrical appliances. Up to 10 million new appliances are sold every year. Owners pay well to keep them in repair and enjoy the convenience they provide. That means there's a fast growing need for trained men.

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Start soon to fix electric toasters, clocks, fans, vacuum cleaners, etc. for neighbors and friends. Spare time work done in your basement, garage, or spare room can earn you $3 to $5 an hour. See how easy it is to increase your earning power—how you can pay for this training many times over with spare time earnings.

Opportunities Increasing For Men Who Know This Profitable Trade

You may want to be your own boss so you can enjoy the profits of your business. Or you may want to qualify for the better job of Service Manager or Supervisor in an Appliance Servicenter. Or perhaps you want to supplement your income doing electrical appliance repairs in your spare time. Opportunity in this growing field is great. Send for free book and see what the Electrical Appliance field offers you!

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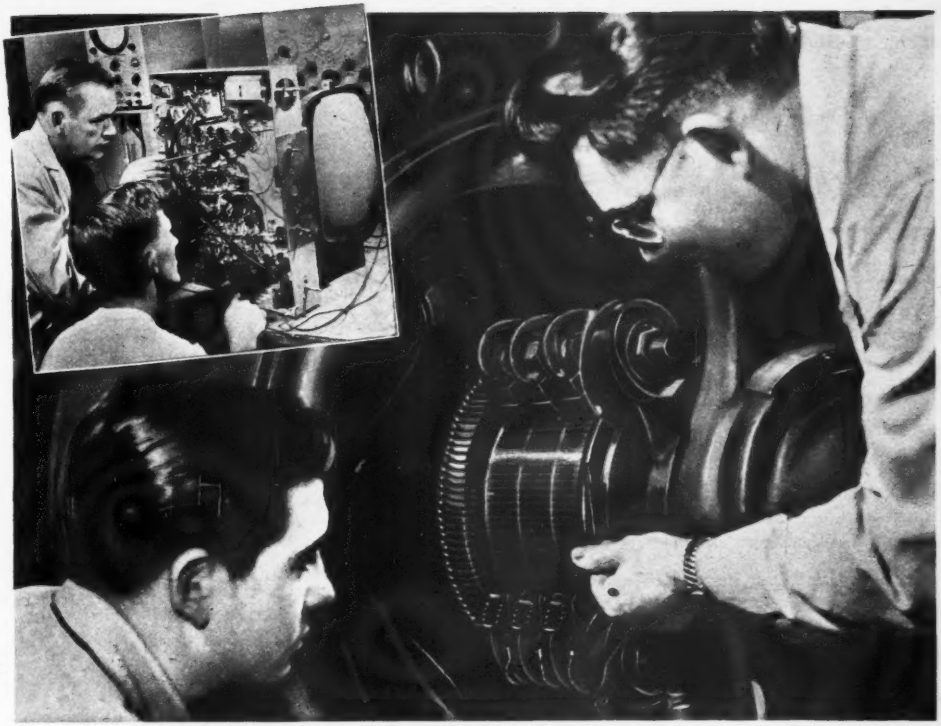

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The story behind FORD'S *exclusive new* LIFEGUARD DESIGN

More than two years of intensive safety research and testing by Ford engineers in cooperation with universities, medical authorities and other safety experts have disclosed some interesting new data on accident injuries—and what can be done to reduce them.

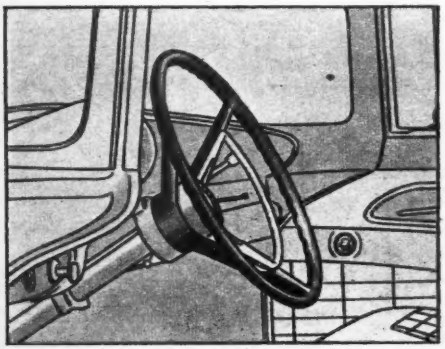
For example, it was found that most serious injuries in accidents were caused by *three* common occurrences.

***First*...** the driver being thrown against the steering post. This called for positive action, so Ford designed a new Lifeguard steering wheel with a shorter steering post and a specially-designed wheel that serves as a protective cushion in the event of an accident.

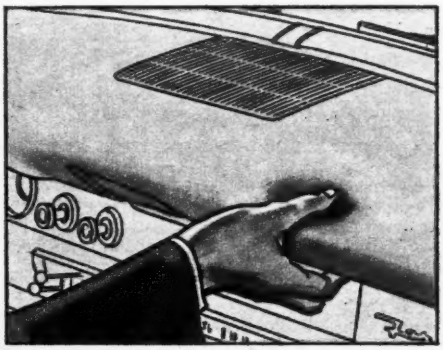
***Second*...** occupants being thrown forward against hard surfaces within the car. This called for special padding of the instrument panel and sun visors. So, Ford for '56 is offering optional Lifeguard padding for these vital areas.

***Third*...** occupants being thrown out of the car. Ford approached this problem in two ways. There are new optional Lifeguard seat belts available to hold driver and passengers securely in their seats. And every '56 Ford has new Lifeguard door latches that feature *double-grip* construction to reduce the possibility of doors springing open under impact.

For the *full* Ford Lifeguard design story—visit your Ford Dealer—soon!

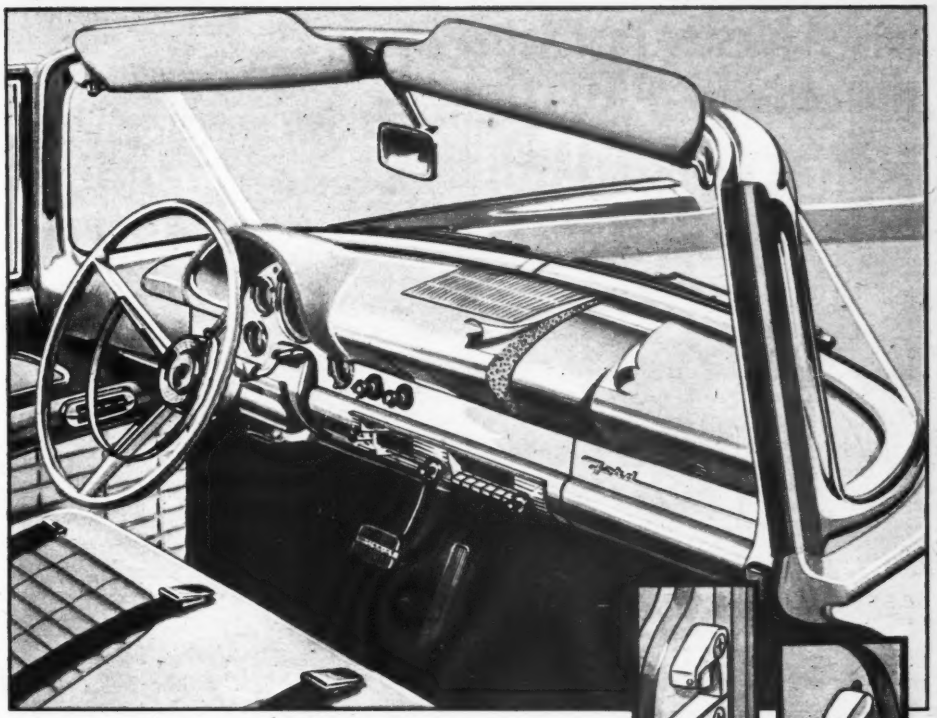


New Lifeguard Steering Wheel. Hub of wheel is more than three inches below plane of rim. Three uniformly spaced spokes are designed to yield under impact and reduce possibility of driver being thrown against the top of the steering column.

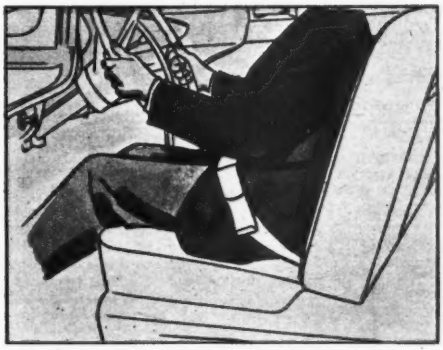


New Lifeguard Padding. The composition and uniform cellular-like structure of the new Lifeguard padding material results in an extraordinary ability to absorb shock. For example, tests show it is five times as shock absorbent as foam rubber.

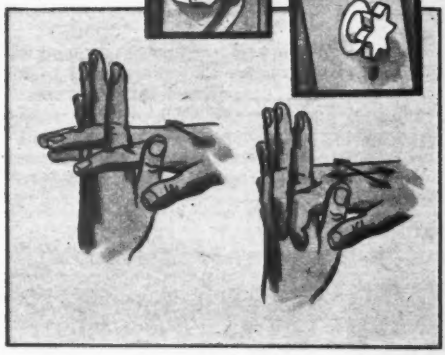
Let Lifeguard design start protecting



You will be safer in a '56 Ford with Lifeguard design



New Lifeguard Seat Belts. They're one-third stronger than CAA requires for aircraft. Each belt is securely anchored to all-steel flooring which is reinforced by husky steel plates. Buckles permit easy one-hand adjustment and finger-tip release.



New Lifeguard Door Latches. Conventional single-grip latches may disengage (like fingers above at left) and allow doors to open under impact. Lifeguard double-grip latches (like fingers above at right) resist disengagement fore-and-aft, in-and-out.

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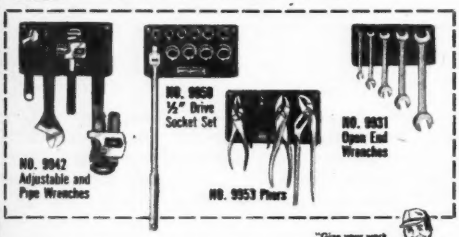

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CRAFTS AND HOBBIES

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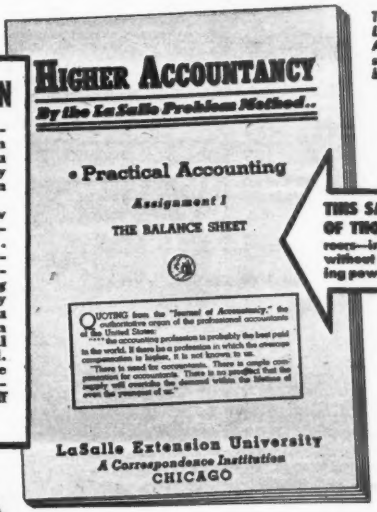

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CRAFTS AND HOBBIES

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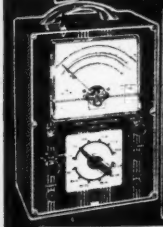

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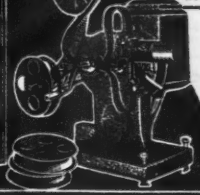

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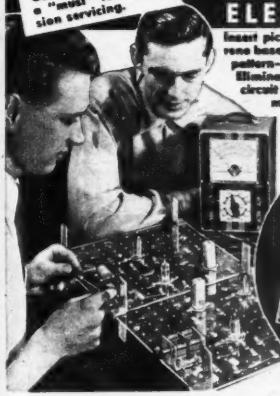

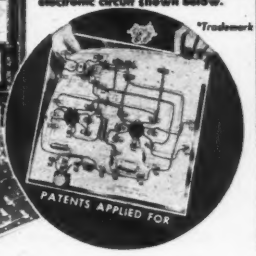

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Learn how to protect your invention. The U. S. Patent Laws provide that any new and useful art, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the Patent Laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of seventeen years.

The Patent Laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. These features must be properly and concisely set forth and claimed in a formal application for patent, in order to comply with the requirements of the Patent Laws. For that reason, unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and are prepared to serve you in the handling of your patent matters.

A specially prepared booklet entitled "Patent Guide for the Inventor", containing detailed information with respect to patent protection and procedure, together with a "Record of Invention" form will be promptly forwarded to you without obligation upon request.

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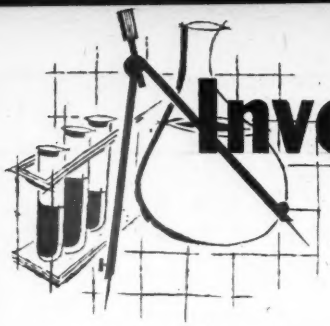

Invention Clinic

Joseph H. Kraus

In this column each month Mr. Kraus will answer as many letters as space permits on those subjects he feels to be of widest general interest. Time does not allow him to reply to any letters except those printed here. Address your questions to the Invention Clinic, *Mechanix Illustrated*, 67 West 44 St., New York 36, N. Y.

Self-stick Tape Holder

Lincoln D. Anderson of Hanford, Calif., sends a sketch and description of a holder for self-sticking tape that makes applying the tape a one-hand job. Would business offices welcome it?

Your design seems to be an improvement over the present style of holder, but it is far from perfect. If you modify it so that a small tab extends beyond the metal you will then have a real one-hand holder always ready for instant application. Unfortunately you are faced with a marketing problem. The largest manufacturer of these tapes is apparently not interested in new holder designs nor in additional applications or distribution. The best chance for a market at present would seem to be through stores handling the tapes —a hard market to crack unless you can arrange to finance manufacture. We recommend that you give much further thought to all of these angles.

Puller Tool

O. G. Stephens of Goodsprings, Nev., has designed a tool for pulling shallow precombustion pots of International Diesel engines.

This seems to be an excellent device. Although its use is limited greatly, and distribution is difficult except through Diesel manufacturers, we feel that you should have your attorney report on a search. Then you should determine whether you want to risk the cost of patenting. Remember that the design of the pre-combustion pots may be changed to permit easier removal; it is even possible that replacements for older Diesels might be redesigned to this end. Your tool would then be useful only as long as the present pots are in use. How long this might be is anyone's guess. But if you could get assurance from the manufacturers that they would cooperate with you in the sale of this tool, your future progress would be easier. Try it through correspondence, outlining advantages only.

Turbine Construction

Fletcher A. Clark of Baldwinsville, N. Y., sends drawings and a description of a turbine which he feels will prevent surge and failure of bucket blades due to extremely high temperatures. Is this design theoretically feasible?

Suppose in your thinking you substitute plain castings and water for the fused thoria, fused salt, liquid metals, timer switch valves, etc. How then is your turbine to work? The only thing these modern materials will give is the possibility of operating at higher temperatures. Such temperatures alone will not improve a non-operable mechanism. Assuming that you will get circulation of the fluid in the channel—and this is a broad assumption—we fail to see how you could obtain more than a very feeble movement of the rotor drum. At this stage it would seem pointless to interrupt your patent procedures. You may be awarded sufficient protection to allow for freedom in exploring the matter further. But before applying for further patents you had better wait until you get your turbine working, even with water. Your fused slats and metal coolants can come as a later refinement.

Typewriter Holder

Sam C. Peacock of Brooksville, Fla., has designed a device which he claims will secure any typewriter to any desk or table. Can we help find some company that will get orders so that he can finance manufacture? What do we think of the idea in general?

You have an idea which you would like to sell, yet have no proof that it is original with you or patentable. You have not sent us enough details to enable us to comment. Your

[*Continued on page* 22]

INVENTORS

If you believe that you have an invention, you should find out how to protect it. The first step is to have a search made of the prior pertinent U. S. patents. If a report on this search indicates that the invention appears patentable you can apply for a patent, and the specifications and claims should be prepared.

The firm of McMorrow, Berman & Davidson, with offices in Washington, D. C., is qualified to take the necessary steps for you. We can make a preliminary search on your invention, advise you whether we think it can be patented, and prepare your application for patent.

Unless you are fully familiar with the U. S. Patent Laws, we recommend that you engage the services of a Registered Patent Attorney to protect your interests. The patent laws are *your* laws. A patent gives you the right to prevent others from making, using or selling the invention claimed in your patent for a period of 17 years.

Use these patent laws for your protection. Investigate whether your invention can be patented. If you have what you believe to be an invention, we suggest that you have this firm make a search for you.

Send for a copy of our Patent Booklet entitled "How To Protect Your Invention," containing information about patent protection and patent procedure. Along with this we will also send you an "Invention Record" form, for your use in writing down and sketching details of your invention. We will mail them promptly. No obligation. They are yours for the asking.

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700x16	6.35	760x15	5.95	750x15	10.95
750x16(6)	8.45	800x15	6.35	30x5	11.25
550x18	4.95	820x15	6.35	600x20	10.95
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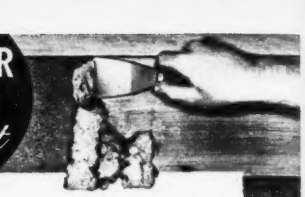

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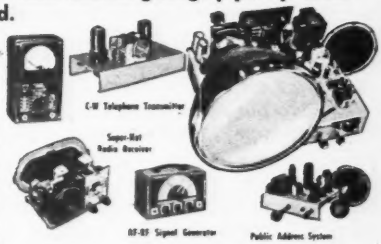

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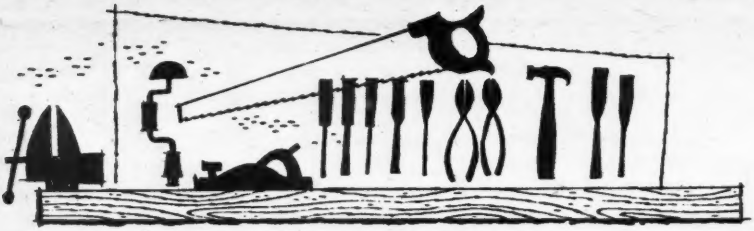

THE EDITOR'S WORKBENCH

● *This, That And The Other*

This month, as every month, we have some extra delicious goodies in the cooky jar of (y)our favorite magazine. And amongst them are complete instructions for building and flying the most wonderful little scale-model airplane you ever did see. This baby beauty is a miniature version of the Lockheed XFV-1, the sensational VTO (vertical take-off) job that some day will make every Air Force general's hip pocket a fighter strip. Just like the prototype, Paul Palanek's scaled-down version (see pages 133-137) has contra-rotating props and when you start the gas engine she takes off for the clouds straight on up. When she runs out of fuel, she flops over to the horizontal position and glides on in for a landing. We've been running build-it articles about model planes in MI for many years, as you know, but this is something as new as tomorrow and you better start working on it right now. . .

But before you do so, be sure to read The VTO Story which leads off this issue of MI and which will tell you just about everything you want to know about vertical take-off flight and how it got started. Between the two stories, you'll be ready to fly, man, and head-first at that. . .

Not head-last, like that Louisiana con I read about the other day who was led into a room where there was this big machine, see, and the stir-boy took one look at it and said, "I'm ready to sign a confession. Just don't make me take that lie-detector test!" Only he had his marbles in the wrong pocket because they weren't trying to get him to confess to anything—they were going to give him a routine health check-up and the gadget he had thought was a lie-detector was only an X-ray machine. . .

Well, lots of people are mixed up these days. Animals too. Even fiddler crabs. Out in South Africa a lady zoologist has learned that when a male sand fiddler is thwarted in love he gets so crazy-mixed-up that he quick starts shoveling mud into his mouth. Only it isn't mud. He just thinks it is. It isn't anything. He just goes through the motions of shoveling mud into his mouth, like any normal fibbler drab likes to—what'd I tell you, we're all mixed up these days. . .

But not half as much as the fish will be when the Norwegians get through with 'em. Some real sneaky fish-hunters out there have come up with a metal container, which has an electric light inside it. The light shines through windows in each of the four sides of the container and when the whole gadget is lowered into the water, fish just can't stay away. They come nosing up close to see what's what. Well, sir, what they can't see is the lower part of the container, hidden from their fishy view by the murky blackness and armed with—you guessed it—deadly sharp fish hooks. When the Norwegians spy enough fish hovering around the lights, in a sort of daze, they jerk up on the line and the hooks do their dirty work. Just don't seem fair to me. . .

Do you know how many completely distinct languages are spoken in the world? Well, I thought not. Anyway, the answer is "about 2,000" according to Dr. J. Alden Mason, the curator of the University of Pennsylvania Museum and a specialist on American languages. Nearly half of these languages are native to North and South America. There are, or were, more separate languages in California than in all Europe. English, he says, is one of the simplest languages in the world. Only Chinese is simpler.—*Bill Parker* •

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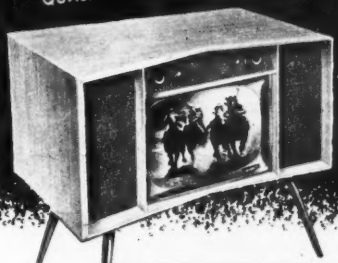

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Invention Clinic

[*Continued from page* 16]

device may be similar to any of a half-dozen bent spring clips which some dealers give away with each typewriter purchased. We can only say that you should at least have a search made. If the article is as good as you say, it may find a limited sale.

Inexpensive Drill-Countersink

W. E. Detwiler of Tampa, Fla., sends a design for an inexpensive drill countersink which he feels could be produced for a few cents. Is this idea worth while?

A regular tool will outlast your substitute by ten or more times, and give better, speedier performance. But the shank which you propose could as well be used in the manufacture of garden tools, and the principle might be adapted to a host of other products. Give this much further thought, then ask your attorney to have a search made. We feel that the shank construction should be played up, with reference to all tools on which it might be advantageous.

Gas Turbine

Arthur B. Cook of Beckley, W. Va., has been asked to build a working model of a gas turbine. He advised the inventor against proceeding until further qualified advice could be obtained. What is our opinion?

You are to be complimented on your analysis. The design is purely a theoretical concept which shows little knowledge of the operation of gasoline turbines or of the known principles of jets. •

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The New Streamlined Model TC-55

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QUICKLY AND EFFICIENTLY TESTS RADIO AND TV TUBES INCLUDING: SEVEN PIN MINIATURES, EIGHT PIN SUBMINARS, OCTALS AND LOCTALS; NINE PIN NOVALS

YOU CAN'T INSERT A TUBE IN THE WRONG SOCKET.

It is impossible to insert the tube in the wrong socket when using the new Model TC-55. Separate sockets are used, one for each type of tube base. If the tube fits in the socket it can be tested.

"FREE-POINT" ELEMENT SWITCHING SYSTEM.

The Model TC-55 incorporates a newly designed element selector switch system which reduces the possibility of absolescence to an absolute minimum. Any pin may be used as a filament pin and the voltage applied between that pin and any other pin, or even the "top-cap."

CHECKS FOR SHORTS AND LEAKAGES BETWEEN ALL ELEMENTS.

The Model TC-55 provides a super sensitive method of checking for shorts and leakages up to 5 Megohms between any and all of the terminals.

ELEMENTAL SWITCHES ARE NUMBERED IN STRICT ACCORDANCE WITH R.M.A. SPECIFICATION.

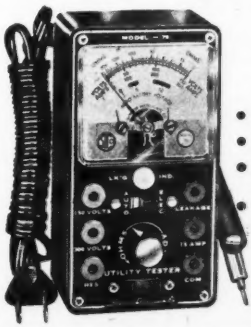
One of the most important improvements, we believe, is the fact that the 4 position fast-action snap switches are all numbered in exact accordance with the standard R.M.A. numbering system. Thus, if the element terminating in pin No. 7 of a tube is under test, button No. 7 is used for that test.

The Model TC-55 comes complete with operating instructions and charts. Use it on the bench—use it for field calls. A streamlined carrying case, included at no extra charge, accommodates the tester and book of instructions.

26.95

FOR REPAIRING ALL ELECTRICAL APPLIANCES MOTORS AND AUTOMOBILES

The New Model 70 UTILITY TESTER



As an electrical trouble shooter the Model 70:

- Measures A.C. and D.C. Voltages, A.C. and D.C. Current, Resistances, Leakage, etc.
- Will measure current consumption *while the appliance under test is in operation.*
- Incorporates a sensitive direct-reading resistance range which will measure all resistances commonly used in electrical appliances, motors, etc.
- Leakage detecting circuit will indicate continuity from zero ohms to 5 megohms (5,000,000 ohms).
  - Will test Toasters, Irons, Broilers, Heating Pads, Clocks, Fans, Vacuum Cleaners, Refrigerators, Lamps, Fluorescents, Fans, Switches, Thermostats, etc.

As an Automotive Tester the Model 70 will test:

- Both 6 Volt and 12 Volt Storage Batteries • Generators • Starters • Distributors • Ignition Coils • Regulators • Relays • Circuit Breakers • Cigarette Lighters • Stop Lights • Condensers • Directional Signal Systems • All Lamps and Bulbs • Fuses • Heating Systems • Horns • Also will locate poor grounds, breaks in wiring, poor connections, etc.

Handsome round-cornered molded bakelite case, 3⅛"x5⅞"x2¼". Complete with all test leads. Also included is a 64 page book giving detailed instructions for testing all electrical appliances, automotive equipment, etc. Only **15.85**

SHIPPED ON APPROVAL

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Try either of the above instruments for 10 days before you buy. If completely satisfied then send down payment and pay balance as indicated on coupon. **No Interest or Finance Charges Added!** If not completely satisfied return unit to us, no explanation necessary.

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Please send me the units checked. I agree to pay down payment within 10 days and to pay the monthly balance as shown. It is understood there will be no finance, interest or any other charges, provided I send my monthly payments when due. It is further understood that should I fail to make payment when due, the full unpaid balance shall become immediately due and payable.

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City ..... Zone.. State.....

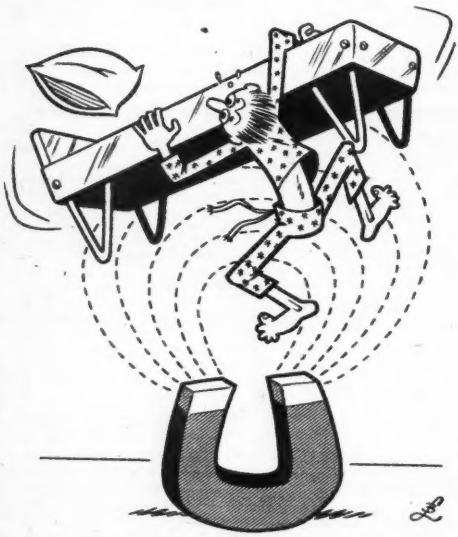
☐ **Model 70 . . . Total $15.85. $3.85 within 10 days. Balance $4.00 monthly for 3 months.**

☐ **Model TC-55. Total $26.95. $6.95 within 10 days. Balance $5.00 monthly for 4 months.**

Dear Editor—

Use this letters column as you see fit—make it a complaint box, question box, suggestion box or even a soap box. But use it! Our only requirement is that you sign your name and please keep 'em short and interesting. Address mail to MECHANIX ILLUSTRATED, Letters Editor, 67 West 44th Street, New York 36, N. Y.

● *Invention Wanted*



In regard to the levitation bed (Readers Suggest: Amazing Marvels Of Tomorrow) in MI's August issue. Why doesn't some genius devise a bed that would work on the principle that aluminum will float on top of a magnetic field?

L. Wirnman
Philadelphia, Pa.

Hmm, wonder what happens when you roll over?

● *Justifies Fiery Ride*

My work requires a lot of traveling and periods of waiting when I find a copy of MECHANIX ILLUSTRATED a source of real pleasure. To be sure I have my copy when I want it, I patronize the newsstands. It is disconcerting, to say the least, to have a subscription copy disappear before you get home from a trip.

Your Buildwords Contest intrigues me. Of course there might be some difficulty in finding scriptural justification for a minister riding around in a Thunderbird but I could always refer to Elijah's ride in a fiery chariot.

Regardless of winning or not, it is fun and I have had a period of vocabulary building and spelling stimulation out of it.

Reverend D. Kirk Hammond
Baltimore, Md.

● *Mystery Solved*

Can you solve this mystery: How come the Buildwords Contest in MI is not open to foreign readers?

Sidney Weltingham
Leeds, England

Slight problem in the delivery of prizes, that's why. Can you imagine shipping a Thunderbird to Poo Ping-Pong in Tibet?

● *Invention Wanted Invented*

A slow dissolving capsule to feed gold fish and tropical fish while you are enjoying a holiday was featured in August MI's Inventions Wanted! column. I have had this item on the market for the past five years, although I didn't allow any advertising until this year as tests were being made by Montreal pet

[*Continued on page* 31]

End Filter Replacement FOREVER!

TRY THIS TEST

This simple "*bronze that breathes*" smoke test demonstrates the amazing porosity of a MICRO BRONZE oil filter. Metallurgists call bronze "the timeless metal." Thanks to war-time and post-war scientific development, MICRO BRONZE engineers now use sintered bronze to prevent undue engine wear and eliminate frequent oil changes.

with Revolutionary New Type

Micro BRONZE

Permanent All-Metal Oil Filter

U. S. Patent Applied No. 444498

ORIGINALLY DEVELOPED FOR THE U.S. GOVERNMENT for use in supersonic aircraft and guided missiles, MICRO BRONZE-type filters are the only filters made that provide *full* lubrication protection for modern automobiles!

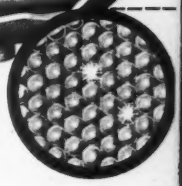
ONLY FILTER THAT DESTROYS ENGINE ACIDS

$6.95 for all models including full flow

FILTERS THE DIRT BUT NOT THE DETERGENTS

Only Filter in the World with Built-in Acid Neutralizer!

Special Acid Neutralizer Element in the Micro Bronze Filter ▶



MAGNIFIED PORTION of MICRO BRONZE filter showing microscopic metal balls fused together to make a solid, but porous, filter. MICRO BRONZE metal can't absorb additives, can't "channel," can't "blow," yet screens out finest particles of grit and metal which drop to bottom of filter housing as "sludge."

THE SECRET IS THE "BRONZE THAT BREATHES"

Here at last is an oil filter that never needs replacing... increases your engine power... ends frequent oil changes... adds thousands of miles to engine life... stops waste of valuable oil additives... and saves you worthwhile money in the bargain! Tests give conclusive proof that MICRO BRONZE type filters are the finest, most economical oil filtering units ever made.

"FILTERS THE DIRT—BUT NOT THE DETERGENT!"

Major oil companies have developed heavy duty oils containing expensive additives and detergents that greatly reduce engine wear. Old-fashioned cloth, paper or earthen filters—standard equipment on many cars!—soak up these beneficial elements, but by-pass damaging abrasives and metal particles into the engine. The MICRO BRONZE exclusive double-cone design *filters out* abrasives and metal particles as microscopic as 39/millionths of an inch (one micron). Oil additives are *left in* to provide a protective film between moving parts. New MICRO BRONZE Oil Filters, combined with modern HD oils, *double your engine's life!*

Burned gasoline creates a strong sulphuric acid solution that eats into vital engine parts, causing them to wear out years before their time. MICRO BRONZE *is the only filter in the world with a built-in acid neutralizer* which adds years to engine life and eliminates the main reason for frequent oil changing.

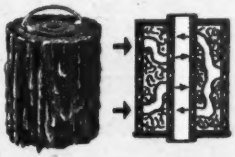
FITS EVERY CAR AND TRUCK

A MICRO BRONZE Unit that fits any standard filter housing including all full-flow models costs only $6.95. Easy to install, never needs changing. MICRO BRONZE Filter Housing $9.95.

You'll save the total cost of your MICRO BRONZE Oil Filter in a few weeks. You save in replacement pack costs and "the quart for the pot" you need every time you change filter packs. *Most important, you save costly oil changes—with average driving, one oil change per year is sufficient.*

SOLD UNDER MONEY-BACK GUARANTEE TO LAST FOREVER!

THROW AWAY YOUR OLD FILTER



At left is shown an old-style filter "pack"—the kind that's probably in your car now. How can a dirty pack keep oil clean? It can't—actually contaminates your oil! Illustration at right shows how ordinary packs "channel" as a result of oil pressure, allowing dirt to tunnel through the pack and into the oil.

THIS MAY BE WORTH $10,000 OR MORE TO YOU!

If you would like to be one of the people we are appointing as a MICRO BRONZE Distributor or Dealer, write, wire or phone us today. Exclusive territories with profit potentials of thousands of dollars are now being awarded. Address: Sales Division, MICRO BRONZE Filter Corp., 11766 W. Pico Blvd., Los Angeles 64, California

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☐ MICRO BRONZE Housing Unit (needed where car does not now have filter) $9.95 (does not include filter element).

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QUESTION OF THE MONTH

"Why are we still building conventional ships when it seems obvious atomic craft are more efficient?"

Asked of: Charles S. Thomas, Secretary of the Navy.

ALTHOUGH the sea trials of the *Nautilus* have been more successful than we dared hope, it must be remembered that in the application of atomic energy to naval requirements we have only opened the door on a new era—we are not yet at home there.

A great deal of research and development is yet to be done before we will know how best to use this revolutionary form of energy in other types of ships.

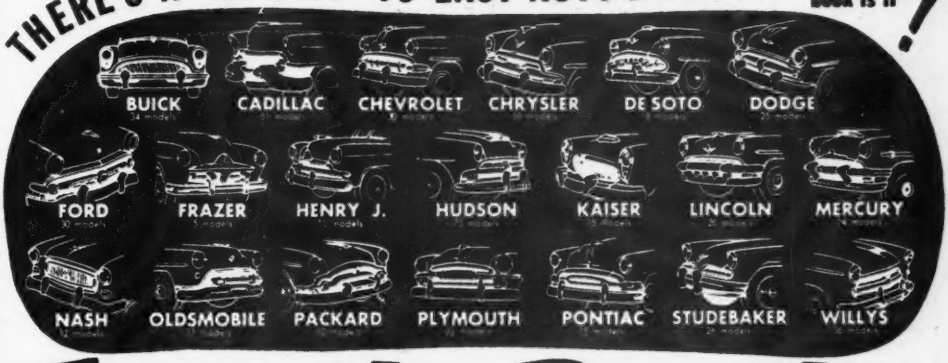
Industrial capability to build nuclear ships is limited to a few shipyards. It will be some time before enough industrial manpower is qualified to build a nuclear-powered fleet and enough naval manpower is qualified to operate it.

In short, this situation cannot be rushed beyond a state of prudence.

Meanwhile, most of our ships, built in World War II, are well along in their life span. If we are to avoid a serious condition of obsolescence we must replace them on a continuing basis.

A potential aggressor cannot be expected to allow us a period of grace while we wait to see the ultimate shape of the atomic revolution in sea power. •

THERE'S A "SECRET" TO EASY AUTO REPAIRS ... and this giant book is it!



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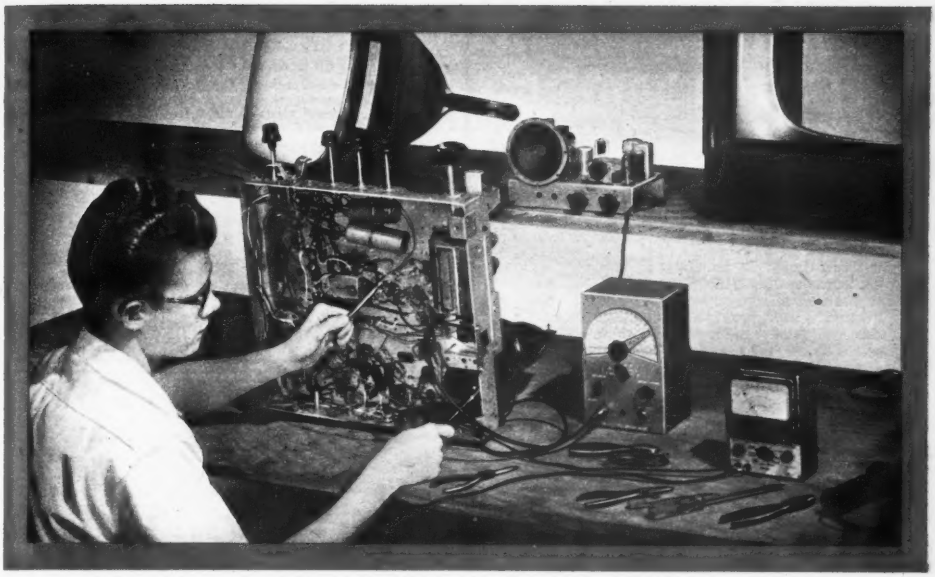

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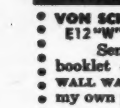

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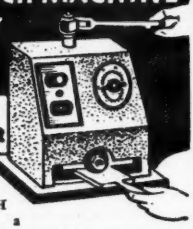

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Dear Editor

[*Continued from page 24*]

shops. It is so far-fetched that I wanted it to be perfect.

I can say now that it is perfected. This small cone-shaped block will feed from ten to 20 fish for two weeks without spoiling the water or turning it gray.

H. A. Corbett
Longuenil, Quebec,
Canada

● *September Mystery Solved*

As an old sheepherder who prefers goats, I say that one sheepherder had seven of the beasts, the other two.

Rodney Fields
Boise, Idaho

Sheepishly, Rodney, we must admit you're right.

● *MI's November Mystery*

Since interest in Russia is at its peak and tourists are being permitted to enter that country in limited numbers, we offer you this tidbit in Soviet geography which is reprinted from Gerald L. Kaufman's The Book Of Modern Puzzles. Here it is:

1. It's as far from Omsk to Umsk as from Amsk to Monsk.
2. It's as far from Minsk to Munsk as from Mansk to Monsk.
3. Monsk is on a straight road north from Minsk to Umsk.
4. Monsk is on a straight road east from Osmk to Munsk.
5. Amsk is 8 miles north of Omsk and 8 miles west of Umsk.
6. Mansk is 6 miles south of Munsk and 6 miles east of Minsk.

How far is it from Omsk to Minsk?
How far is it from Umsk to Munsk?

● *Aroma O'er The Ocean*

There is one thing I like you Americans for, you are certainly not too fond of yourself. Take July MI, on the subject of ingenuity and man-caliber of the USA (America's Secret Weapon) or Mr. McCahill (McCahill Exposes The Secrets Of The Hop-Up Experts) where all the mechanics in England, France, Italy and Germany are ruled out.

Dear Editor, it stinks over the ocean. Just look at the world champion race list.

Walther Hjuler
Copenhagen, Denmark

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LATE NEWS FROM CALIFORNIA

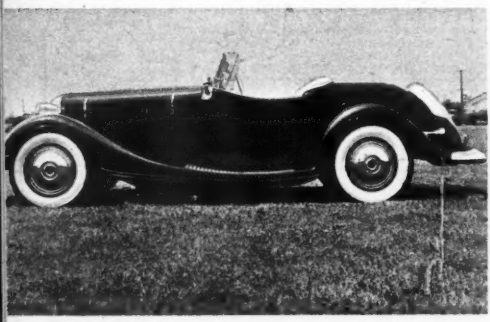
By Eugene Jaderquist

IN THE rapidly-changing world of hot rodding, the only way to keep up with the fashions is to go to the events. At the drags and the lake meets you can see the latest in competition machinery; at the shows you get a comprehensive look at streets jobs.

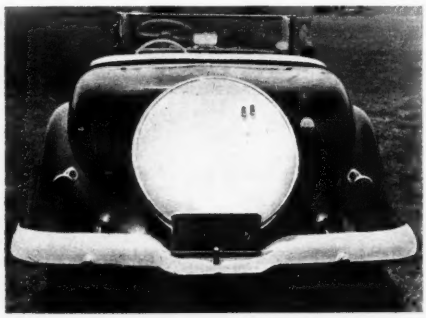
The last show I went to, an open-air hot rod and custom car show in Norwalk, Calif., revealed a number of trends in the field. Norwalk is located in the heartland of hot rodding, the southeast section of Los Angeles. In it and surrounding communities are concentrated both the veterans and the newcomers to the hobby. This particular show drew entries from all over the Los Angeles area, spectators from as far away as San Francisco, 400 miles to the north.

From the beginning, the complete lack of interest in the classic rod was apparent. There were streets roadsters, of course, many of them in top condition. They were equipped with the old standard Ford flathead engine, the early Ford body, the usual chassis modifications. And half of them carried "For Sale" signs. Whether for sale or not, none attracted a circle of admirers. Even a beautiful '40 Ford coupe that would have been in style a few years back was for sale—and for only $450, asking. The '32 roadsters were on the block at prices from $250 to $600.

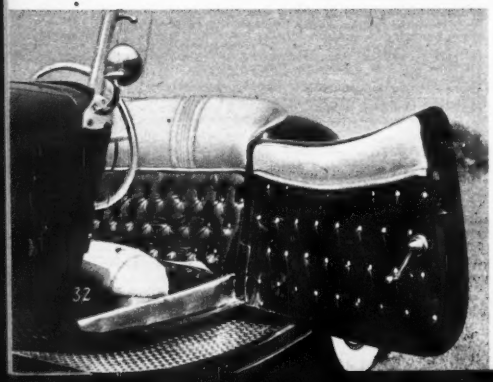
I talked with one of the owners of the '32s and asked [*Continued on page* 35]



California sports rod with classic look has '41 Ford frame, '33 Ford Tudor body.



Oldsmobile Rocket engine, '35 truck grille and shell, and bumpers from a '53 Lincoln.



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Hot Rods & Custom Cars

[*Continued from page* 32]

him if he needed the money this badly.

"Sure," he said, "I'm behind on the new car I'm building."

The trend in customs was much as reported in this columnist's interview with Neil Emory a couple of months back. Gone were the wild, wild chops and the too-garish paint jobs, the utterly fantastic grilles and the aircraft instrument panels. Most were late-model bodies, of course, and all these carried late-model, overhead-valve engines. A lot of attention had been paid to interiors, with the expensive rolled-and-pleated plastics still the favorite with those who can afford them. Dechroming the exterior is still popular, but with a difference. Today's style calls for selective dechroming. You remove only those pieces of chrome which tend to detract from the overall lines of the body—hood ornaments, door handles, deck latches, license plate brackets—but you leave the chrome that is an integral part of the body design. Such elements as the Buick spear and the Ford notch-line are retained. So are the purely functional pieces like heavy bumpers and solid side rub strips.

Concepts of lowering have also undergone a general change. The famous tail-draggers with their six-inch clearance between body and ground have almost disappeared. These proved not only impractical but hard-riding as well. Best customs today are level, lowered to a point one or two inches below stock '55 models.

Newest gimmick, and one that may spread throughout the country because it's inexpensive, is paint decoration. This is an art that requires a craftsman of more than usual talent. Decoration is by fine lines of contrasting, yet harmonious color. The lines aren't more than ⅛ inch wide. They trace the important design features of the car for emphasis. In some, a line will follow the front hood line about four inches above the grille, then sweep back as a horizontal line of color below the belt line of the body. In the center of the hood, about where the hood ornament usually goes, there is frequently an abstract design made with the same fine paint lines.

My own choice for star of the show was

[*Continued on page* 37]

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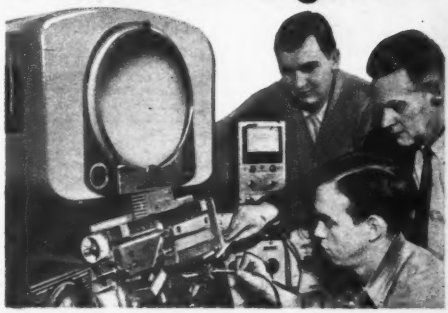

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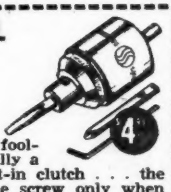

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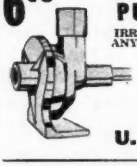

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Hot Rods & Custom Cars

[*Continued from page* 35]

neither custom nor hot rod but a completely different sports rod. The builder, Henry A. Rootlieb, is a professional auto body painter. He puts two and one-half years and approximately $2,000 in cash.

It all began with a '41 Ford frame, a '33 Ford Tudor body, and the Oldsmobile Rocket engine. The frame was shortened from its original 116-inch wheelbase to a 102-inch wheelbase. In addition, the overhang, front and rear, was cut to nothing. The body was cut down low and removed from its stock hard top to made a nearly unrecognizable sports roadster body shell. The stock '33 Ford grille was scrapped in favor of a '35 Ford truck grille and shell.

The result, designwise, is a sports rod with a classic sports car look, resembling slightly the prewar SS 100 models produced by Jaguar. Like that particular Jaguar, this sports rod was built more for show than for go. The Oldsmobile engine isn't hopped up, the drive train—a stock '41 Ford transmission and 3.78 Ford rear end—isn't designed for anything more violent than street activity.

The entire show was an outstanding example of good relations between hot rodders and community. Norwalk is an incorporated city of approximately 12,000 residents. The Coachmen Car Club of Norwalk conceived the idea for the show and sold it to the Junior Chamber of Commerce. The car club handled the job of getting the cars and classifying them into judging categories for trophies; making up entry blanks and shepherding the cars into their proper places on the show site. The Junior C. of C. helped to obtain the show site—the football field of Excelsior High School in Norwalk—donated trophies and was active in publicity.

If you're interested in more information about the Norwalk show and the behind-the-scenes work required to put it on, you can write John Beddow, 11469 McLaren, Norwalk, Calif., or the Junior Chamber of Commerce of Norwalk. Among other tips they have to pass on is a new point system for classifying customs for judging so that the mildly customized car will have as much chance to win a trophy as the prohibitively expensive full custom. •

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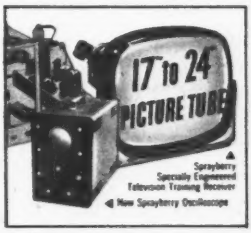

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The *Pirouette* is a miracle of precision design on the inside, embodying the exclusive "flick shift" speed mechanism, with 3 idler wheels mounted on a single movable plate. Insures professional speed accuracy and trouble-free performance.

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The history-making T-18 with hysteresis motor...a magnificent hi-fi instrument. $108.

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The 16" version of PRESTO's flick-shift T-18...for homes with fine hi-fi collections. $79.50.

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650x16(6)	7.16	710x15	5.36	760x17	11.16	825x20	19.76
700x16	8.96	760x15	5.86	750x15	13.06	900x20	19.76
750x16(6)	8.36	800x15	6.26	825x15	14.76	1000x20	20.06
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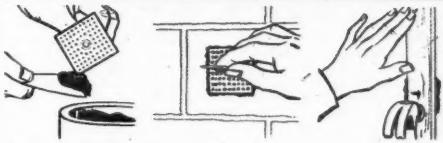

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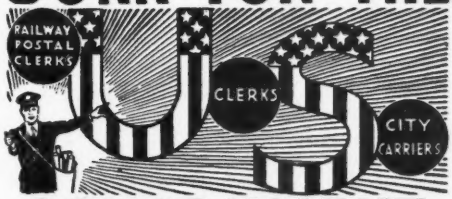

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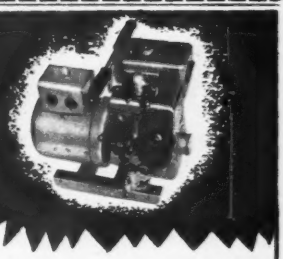

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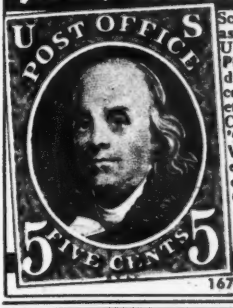

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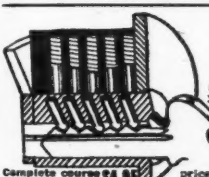

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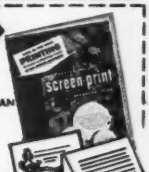

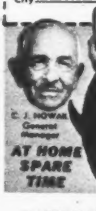

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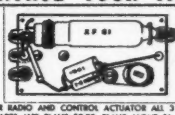

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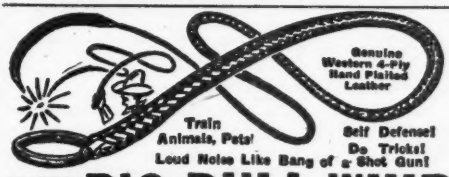

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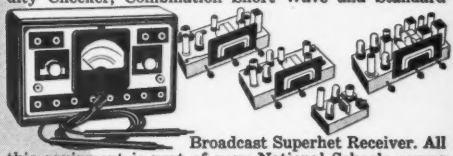

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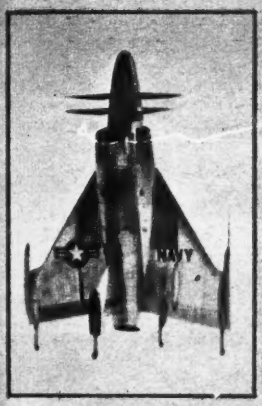
The VTO Story



World's first vertical take-off plane is Convair's XFY-1 delta-wing Pogo.

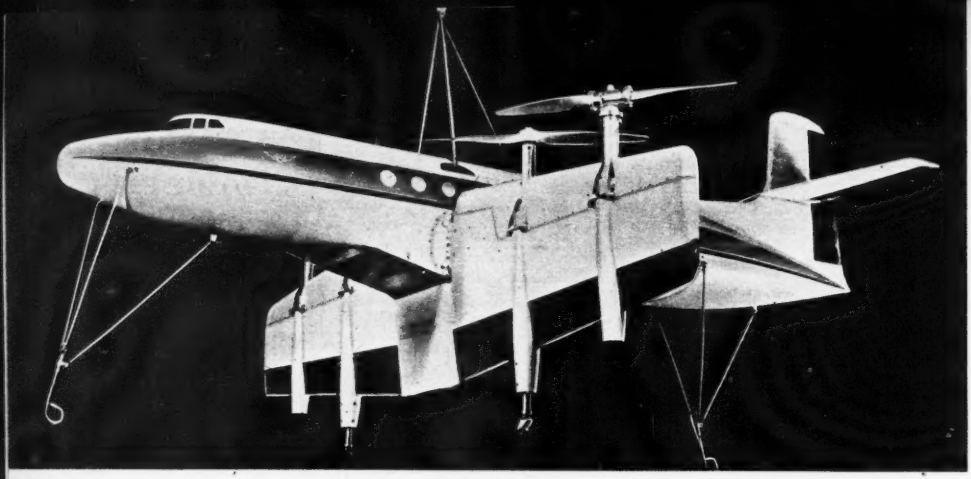
Aviation is taking a new direction—straight up with weird vertical take-off designs.

By David W. Barclay

Air jets from hose lift man in NACA test at Langley Field, Va.

VTO means vertical take-off and it's an old story if you're talking about balloons which have been taking passengers straight up since 1783. But it's a new concept in heavier-than-air machines, even though one of Cierva's Autogiro's went straight up as long ago as 1935.

Today a marvelous variety of experimental aircraft is being studied with one object in view—a VTO design that has the forward speed of a plane. The helicopter's chief limitation is its mph deficiency. It will never compete—in its pure form—over the long-haul air routes such as New York—

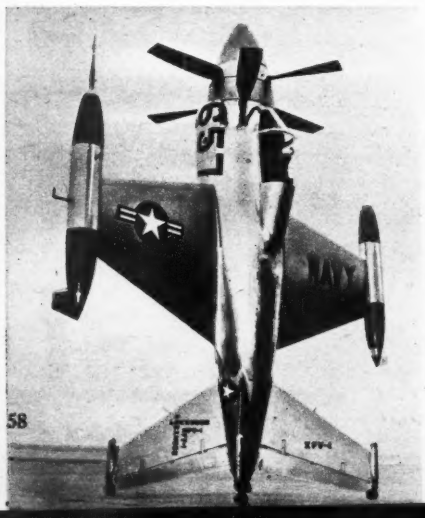


Scale test model of transport that can take off, land like a helicopter. Wings tilt in vertical position with props pointing skyward for take-off, return to normal in flight.

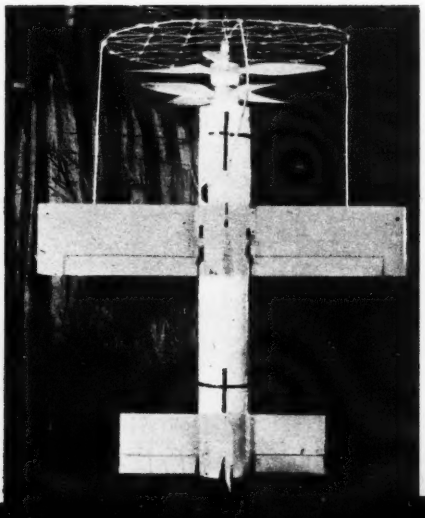
Los Angeles. But planes with VTO would take most of the agony out of airport management and operation. Any fairly flat space of any shape and of relatively modest size could be an airport and surrounding buildings or hills would no longer count as approach hazards. Ceiling Zero, Visibility Zero would be standard operational minimums for all airports. For the traveler, life would be rosy—no more weather delays, no more costly and time-consuming city-to-airport transfers—because the airport would be in the center of town. Strategic military airbases could be set up on short notice simply by flying VTO combat and service craft into any cow pasture, ball park or lonely spot along the coast.

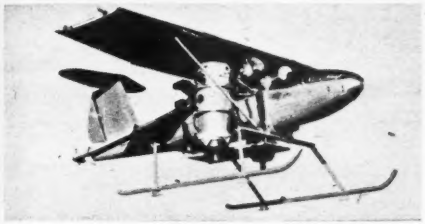
The familiar tail-sitting Navy VTO's employ a helicopter type of rotor for lift that also serves as a nose prop. They can also come down butt first, oh-so-gently. These turboprop-powered VTO's aren't hot enough to be part of a carrier's striking force but they will provide a fine aerial defense for surface ships with limited deck space. When the carriers do go VTO, however, they'll double their airpower (no more wasting

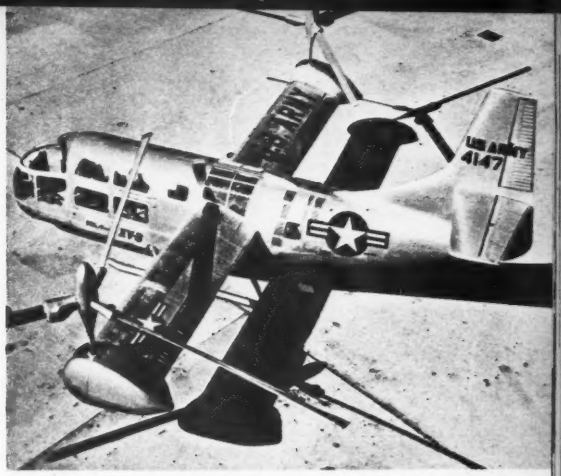
Lockheed XFV-1 has special trolley to put it in VTO position and to move on ground.



First vertically-rising model plane flown by NACA in free flight tunnel back in 1949.







Convertiplanes like McDonnell's XV-1, top, Bell's SV-3, above, are still being tested.

Bell XV-3 test job is tilting rotor type convertiplane which converts in 10-15 seconds.

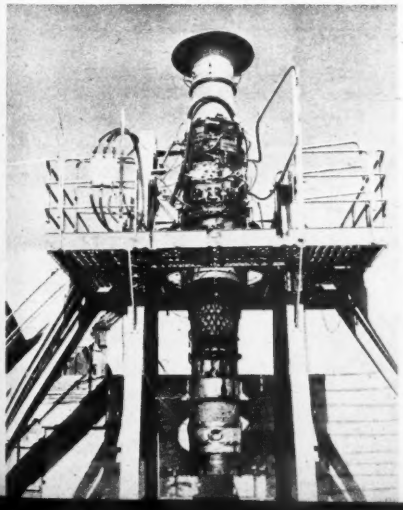
deck space on runways) with planes that never sit helplessly on deck.

The Russians have been in the VTO race the longest; their CZ-2B jet was on the drawing board in 1947 and reliable reports of its performance are in the possession of the RAF. Plans for a VTO fighter were found in the Focke-Wulf plant in Germany at the end of World War II. The Jerry VTO had ram-jet engines on the tips of a rotor mounted waist high on its fuselage.

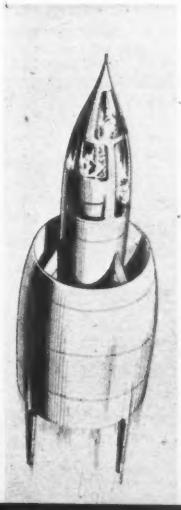
Current American work on VTO jets is making giant strides. The big problem now is controlling the jet blast; one solution is to direct the blast through controls inside a "Flying Barrel."

Obviously tail-sitting planes possess small appeal as passenger carriers. The paying public likes to sit natural. For this group the convertiplane will be the answer. One general type of convertiplane tilts its rotors or jets to go from vertical to forward flight; another general type uses deflecting surfaces to turn its blast downward during landing and take-off. Whichever emerges as the most acceptable type, there's no doubt of the new direction aviation is taking. It's straight up. •

French test bench checks VTO turbojet power plant.



Artist's idea of supersonic annular-winged Coleopter.



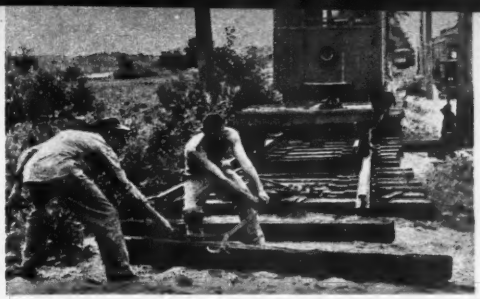
Rolls-Royce Flying Bedstead employs jet-lift principle.

Home for Aged Trolley Cars

Old faithfuls of the SER wait stolidly on sidings as a new acquisition rolls by on a test run.

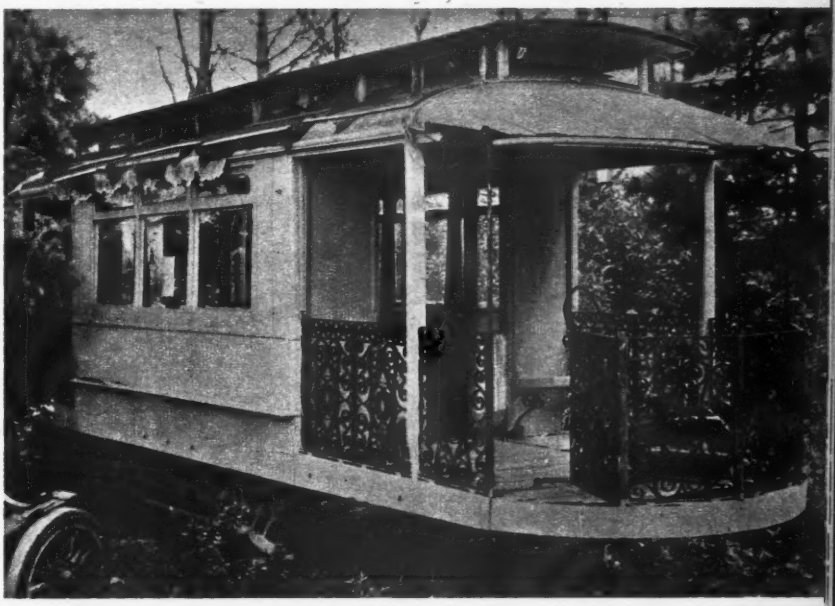
THE Seashore Electric Railway of Kennebunkport, Me., is a short stretch of track going nowhere. It's run by and for people who miss the rattle-clang of the streetcars that have been discarded by Progress in favor of malodorous diesel buses. Fifteen years ago three sentimental Bostonians acquired a 12-bench open trolley; now the New England Electric Railway Historical Society has 300 members and owns rolling stock from points as far away as Denver and Minneapolis. •

Maintenance crew includes an electronics engineer, a cop, a teacher, a bank teller.



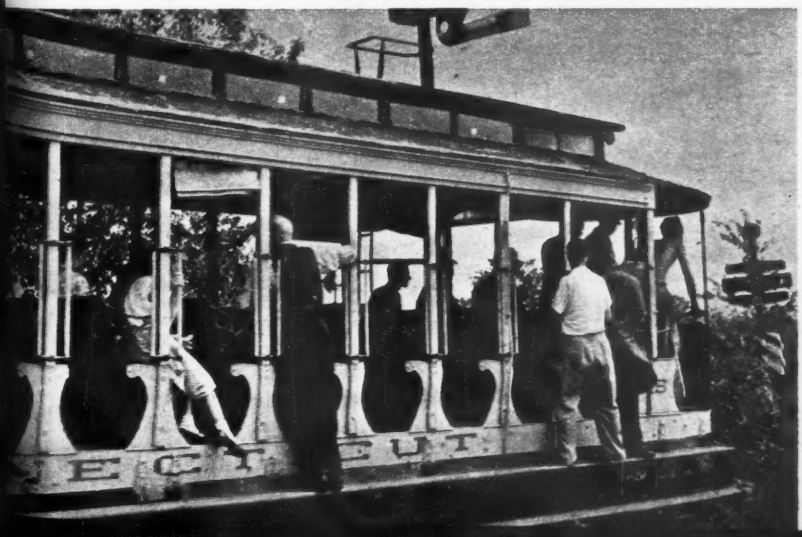
Trolley lovers volunteer for hard work like laying ties, dream of miles of noisy riding.

Visitors pay voluntary fares. In background, 50-year-old Twin City car.



Open car below, a great favorite, was built back in 1901 for the Connecticut Company.

This 1895 beauty was built for officials of the Manchester, N. H., Street Railway Company.



"HOW'S THE WEATHER UP THERE?"

Each new generation of American males is increasing in size and puzzled anthropologists just don't know where we're going to end up.

By William Kelley

Bob Wadlow, the biggest modern giant, was 8 ft. 11 inches.

YOU'RE a bigger man than your father. You tower over your great-grandpa. And if your ancestor fought in the Revolutionary War, he was a runt compared to you.

All this adds up to an astonishing fact which has anthropologists puzzled and certain manufacturers scratching their heads. Slowly, but just as inevitably, American males are increasing in size with each succeeding generation.

Where is it all going to end? Dr.

Harry L. Shapiro, curator of the department of anthropology at the American Museum of Natural History, has looked into the matter extensively and concludes:

"Even if this trend should appear desirable and we take pride in our rising statures, we should soon reach a point where further increases would become rather alarming. Are we experiencing a transformation into giantism, with averages of 6 ft. 6 in. or 7 feet within several hundred years or so? Are we heading for ungainly dinosaurian proportions that will lead to our extincton?"

Nobody knows the real answer, as of now, but one thing is certain. The phenomenon has not been lost on various phases of industry, even the U. S. Government. After all, if Americans are blossoming upward and outward, there are some pretty important adjustments that have to be made.

Americans' extra height and bulk makes it necessary for clothing manufacturers to watch the situation closely and alter their sizing formulae accordingly. Auto manufacturers are keenly aware of what's going on, hence are careful to provide easily adjustable seats. Factory equipment must be made with controls that can be easily and safely handled by taller workers.

And then, of course, there are beds. This may come as news to most people—there has been a virtual revolution in the bed and bedding industry, just now coming to a head, and all because we're getting bigger.

Not long ago, manufacturers began noting with some consternation that more and more beanpole Americans were trying to slumber in sacks that didn't fit them. More and more big folks were being forced to lie diagonally across beds and more and more feet were being exposed to frosty winter nights as covers were brought up under chins.

Obviously, something had to be done. The bed and

Don Koehler's diminutive 5-ft. 6-inch Mom adjusts skyscraping 8-ft. 2-inch son's coat.

Tailors need ladders to measure 8-ft. 8-inch circus goliath Olaf Petursson for suit.

Two hospital beds placed end-to-end, above, were needed for 8-ft. 5-inch Ernest Evans shown with his bicycle, at right.

bedding makers huddled with each other and then went into an earnest series of confabs with experts at the U. S. Department of Commerce's Commodities Standard Division.

The aim: New dimensions to give Mr. Highpockets an uncramped night's snooze. Results: King-size beds, mattresses and covers which are in production right now and will soon be on the market.

First, while the reason why folks are getting taller is not yet known, one thing is certain: It's a definite advantage, all things considered, to be on the large size.

Personnel managers, for instance, admit frankly that if two men with equal qualifications apply for one job, the nod generally goes to the taller. A survey by the Provident Mutual Life Insurance Company of Philadelphia discovered that the bigger the man, the more insurance he carries. B. Franklyn Blair, who was in charge of the study, concluded that tall men have greater financial success since the amount of insurance held has always been a tip-off on a man's earning power.

Does a tall man live longer than a short one? Dr. Louis I. Dublin, vice-president and statistician of the Metropolitan Life Insurance Company, answers, "For the most part, very short and very tall persons merely represent the extremes of normal height distribution and their longevity does not materially differ from the average."

Discounting the giants of mythology and the fairy tales, the tallest man who ever lived was an amazing fellow named Robert Pershing Wadlow. According to the Journal of the American Medical Association, his story "exceeds every other documented case of giantism."

Wadlow came into the world in Alton, Ill., on Washington's birthday in 1918 and there was no indication that nature was playing one of her strangest pranks of all time. Young Wadlow weighed a normal eight-and-a-half pounds and for the first few months progressed as any baby would.

Suddenly the infant began to grow at a phenomenal rate. At six months he weighed 30 pounds, as heavy as a two-and-a-half year old boy. At four he looked as tall as a youth in his teens. At nine, he could lift his 150-pound father and played with an express wagon that could hold three men.

Wadlow added three inches to his height every year. At 11, he had his picture taken with former heavyweight boxing champ Primo Carnera, a giant himself, and shaded the Preem by a good two inches. At 16 he measured 7 ft. 10 inches and at 22—the year he died following an ankle infection—he was fully 8 ft. 11.09 inches tall and weighed 495 pounds!

Actually, there are several different types of giants, all caused by hormone oversecretions of one kind or another by the body's master gland, the pituitary.

One is the so-called normal giant, whose body simply grows larger than anyone else's but in proportion.

Another is the eunuchoid giant, whose growth hormones increase but at the same time there is a decrease in the sex-stimulating secretions.

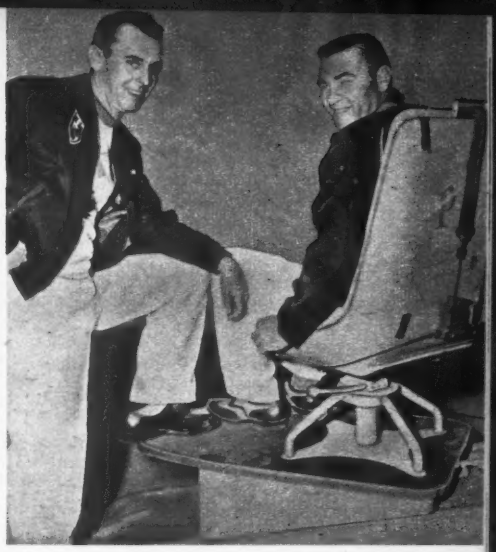
Third, and probably most frequent, is the acromegalic giant. His hands, feet and face are grossly enlarged, his vocal cords become long and thick and hence his voice rumbles in a thick basso profundo and he develops an enormous chest.

Even though science tells you that you're growing taller with every generation, that still doesn't help the little fellows right now. The big question, as far as they are concerned, is this: Can anything be done, outside of wearing lifts in the shoes, to increase height?

There is no pat answer. Directors of gymnasiums point out that proper exercises can improve posture to such a degree that a man can actually look a good deal taller. Some gym owners insist that various spine-stretching exercises can add up to an inch or more if the subject is still in his early 20's and still supple. A number of doctors, on the other hand, scoff at the "torture methods" and claim they don't help.

And if by chance they don't, be consoled by science's promise: Your grandson will surely be a bigger man than you, and that's no tall story. •

Racing driver Chuck Stevenson and harness. It is bolted to the floor of the car.



Johnny Mantz (left) and Stevenson lab test harness reel's automatic snubbing action.

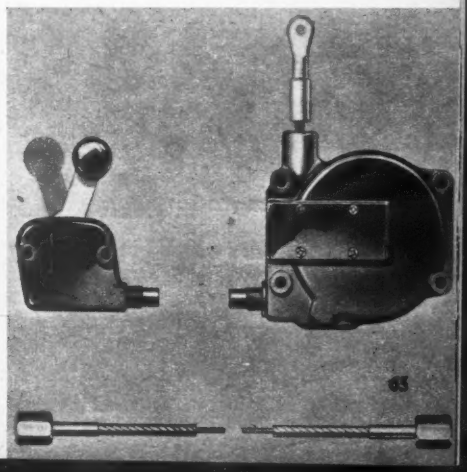
NEW SAFETY HARNESS

At least four famous racing drivers owe their lives to this simple 2½-pound safety gadget.

FOUR Lincoln crew members of the recent Pan American-Mexican Road Race attribute their lives to the new Pacific Harness Safety Reel which bolts to the car's floor. Attached to a shoulder harness, the reel allows cable to feed in or out, giving the driver freedom of movement up to 18 inches. But in an emergency, the reel locks instantly and automatically, snubbing the driver within just one-half inch of travel—perhaps saving his life. •

Novel harness saved lives of driver and co-pilot of this demolished Road Race Lincoln.

Three part harness consists of manual control lever, reel assembly, control cable.



Wood, Wares And Wonders

CHANNEL Lumber Company is channeling a big hunk of the home repair and improvement business in Springfield, N. J., into its drive-in branch there. Besides lumber Channel sells kitchen ware, plumbing fixtures, laundry hampers, dog equipment and allied lines. Weekends the store runs how-to-do classes. •

Right: customers pick up ready-cut lumber, pay for it as they drive out.

Fifty-two-foot sign shouts all-out policies to rolling army of do-it-yourselfers.

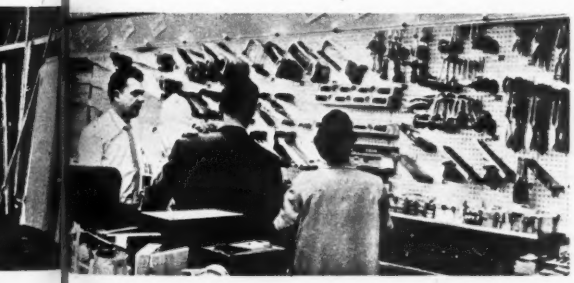
Supermarket methods have made

For all the huge size of the operation, customer relations are on a folksy basis.

Free coffee for the trade on weekends is typical of ingratiating Channel methods.

Display of clocks of many styles looks like instrument panel in a Buck Rogers space ship.

one lumberyard a paradise for a big-spending horde of home-makers.



Clerks know what weekend handymen need even if the handymen don't themselves.

Channel supplies power tools and advice for cutting your lumber to specifications.

The check-out line, handled with friendly efficiency, tends to build up on weekends.

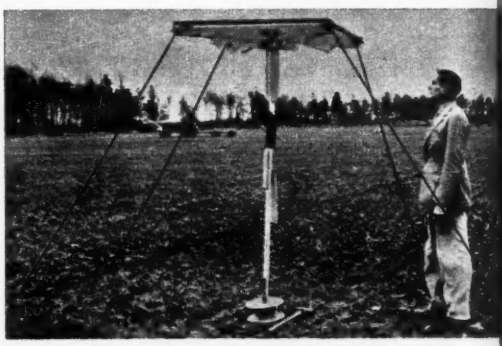
To avoid this you can borrow a car top carrier from the store for a $6 deposit.

Farmer Cory watches his robot tractor at work rolling 16 acres of winter wheat all by itself.

Mechanical Hired Man

Britisher's relentless ploughboy quits only when the work is done.

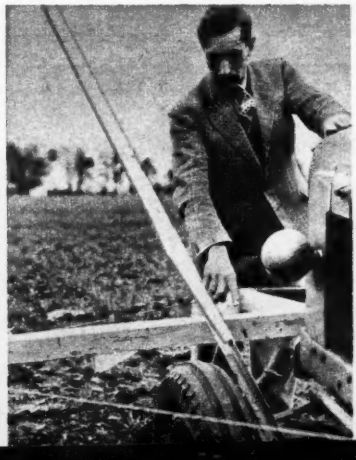
FARMER E. A. Cory of Compton Abdale, Gloucestershire, England, has designed a completely automatic tractor control. His Fordson Diesel tractor has a steering arm connected by light cord to a square reel he can set up in the center of any ground he wants to work. Once started, the tractor works in a widening circle until the line is played out, returns as the line rewinds, stops when it reaches the control post. •



Square reel in the center of the field will adjust to suit any tractor-drawn tool.

Cory and experimental cardboard control cord link that breaks in rain, stops work.

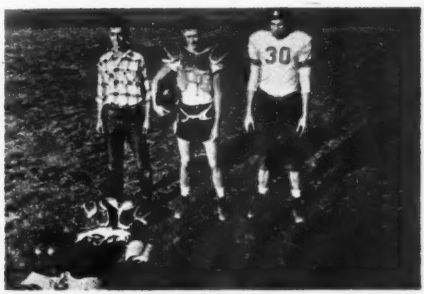
Cory shows how the control arm is attached to the steering mechanism of his tractor.



Safety measure: the slightest touch on control bumpers cuts off fuel, stops tractor.

Gridiron Safety Gadgets

Plastic face guard, rubber pad minimize injuries to nose, eyes, teeth.

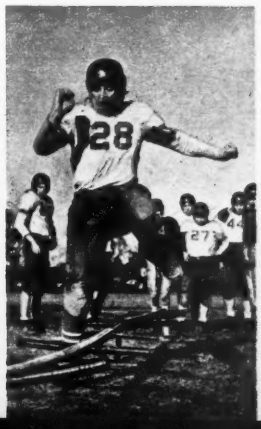


Glen Cove, N.Y., high school players demonstrate stages in buildup of body protection.

Post running develops agility, which means better trained, less injury-prone athletes.

New armor, new training techniques and devices keep a Long Island high school team at full fighting strength.

Keeping pipe between legs, he hurdles rubber arms of "nimblizer" training device.



Rubber arms pull at his; this gadget has cut down fumbles by Glen Cove team.

Portable blocking dummies give blockers and holders specialized muscle training.

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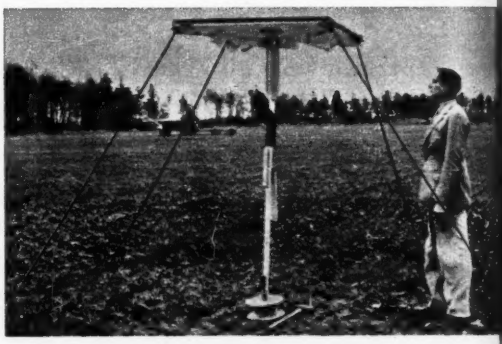

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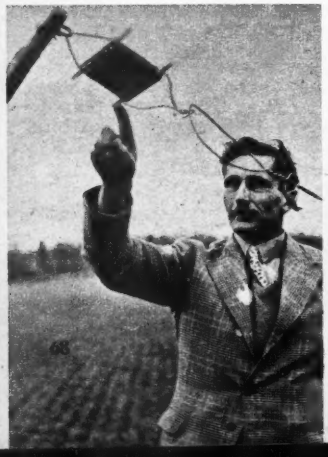

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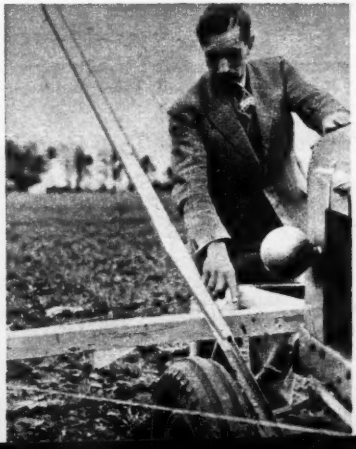

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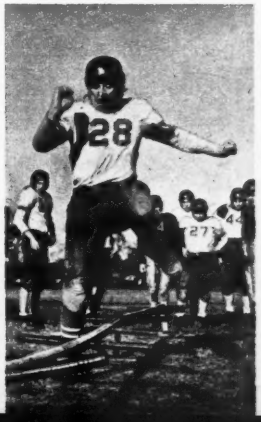

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THE MYSTERIOUS DEATH OF GEORGE WELCH

F-100 Super Sabre Jet in flight.

The only clues were in the mangled remains of his F-100 and some scraps of light-struck film.

By Raymond H. Rice

Vice-President and Chief Engineer, North American Aviation, Inc.

IT WAS 10:46 a.m. on a warm, clear fall day at the Palmdale, Calif. airport. The date was October 12, 1954. George S. Welch, 36-year-old chief engineering test pilot for North American Aviation, sat strapped in the cockpit of an F-100 Super Sabre Jet at the end of the runway.

Even as gruelling test flights go, this was to be far from the ordinary. Instructions on the flight card outlined the entire procedure:
(1) symmetrical pull-up; (2) pull-up altitude: 23,700 feet; (3) speed: supersonic (classified); (4) load factor (G's): more than seven times the pull of gravity (classified).

In short, with his prescribed combination of speed, load factor and altitude Welch was to do things that never before had been done with a plane. This particular flight was the last in a series of slow buildups to a maximum structural test called for by U. S. Air Force specifications for the Super Sabre.

No. 764, the plane to be tested, had logged 47 previous flights for a total of 16 hours, 35 minutes in the air. An extensive pre-flight examination revealed everything to be in perfect working order.

Twelve minutes after take-off Welch reported by radio to his flight test engineer on the ground. He was ready to begin the dive. Two minutes later, at 11 a.m., the pilot's clear voice came over the radio again: his position was directly over the Mojave Desert, above his aiming point of Rosamond Dry Lake. That was the final message from George Welch.

Seconds later the Palmdale tower messaged North American engineers that two parachutes had been seen to open near the dry lake at about 20,000 feet altitude. Flight Test emergency procedures began. Two Navions roared off the Palmdale runway and were circling the chutes before they touched ground. One parachute carried the unconscious pilot toward the ground. The other was the free-falling drag chute torn from the tail of the F-100. The plane had disintegrated.

George Welch died of internal injuries enroute to the hospital. One of the most experienced test pilots in the business, he had been with North American ten years, had made the first flight in the first F-86 Sabre Jet back in 1947 and had been testing the F-100 since he'd put the first of these ships through its maiden flight on May 25, 1953. Now, the screaming dive in No. 764 had ended in disaster, and with it George Welch's career and his life. Why?

Empennage Group engineers reconstruct: an erratic shadow gave them their lead.

Salvaged oscillograms showed Welch had encountered an unexplainable phenomenon.

Within minutes after the crash Industrial Security personnel from North American moved out to the wreckage area. Later came design and flight-test engineers. Air Force personnel from Flight Safety at Norton Air Force Base were dispatched. The investigation began. Jeeps and helicopters were called into the search and men on foot combed the desert floor to make sure no major parts were missed. Virtually every part of the ship was recovered. Each was identified, photographed and categorized where it lay. Detailed maps were drawn to show the fall pattern.

Meanwhile, Industrial Security investigators interviewed residents in a 64-square-mile area of the desert ranchland in search of eye-witnesses. In all, 173 were finally found and gave statements of what they had seen—some conflicting, some perceptive, but all duly recorded.

Two unusually credible witnesses were Air Force pilots who had been flying a B-47 jet bomber at 25,000 feet over Palmdale at 11 a.m. Both had spotted the F-100 some five minutes earlier.

When the F-100 was three and one-half to five miles ahead and to the right of their bomber, the fliers said, it did a wingover and went into a dive. They noted that the turn was made in less than one-half mile, contrasting with the ten miles required for their own ship. The F-100 passed their altitude in a 70 or 80-degree dive, traveling so fast they had to move their heads quickly to follow it. Then the Super Sabre suddenly came apart in what appeared to be an explosion. At no point did the Super Sabre give the impression of lack of control, structural failure or a violent maneuver.

After every fragment had been identified, photographed, categorized, and plotted on a map, the wreckage was trucked to Los Angeles for phase two: study of parts.

Recovered equipment revealed that the pilot's safety devices had functioned properly. If he had not been injured fatally in the plane's breakup he would have survived. This was the first concern of the investigation.

Indicative of the thorough treatment given every piece was that accorded to a series of short parallel black marks on the underside of the right horizontal stabilizer. The black material was carefully scraped off and sent to the Engineering Research lab. There it was placed in a small vial and cataloged with many similar specimens from other parts of the plane. Analysts found that two materials were involved in the black streaks: black body sealer and neoprene rain erosion resistant from the leading edge of the vertical stabilizer.

Because it was a test airplane, No. 764 was rigged with many special recording instruments, all of which were operating up to the moment of disintegration. The Empennage Group was able to reconstruct the movements of the tail section during and shortly after the breakup from exposed movie film taken from a camera in the vertical stabilizer. Trained on the left horizontal stabilizer,

the camera continued to grind from its own momentum for a few frames after its electric power had been cut off. The film was removed unharmed at the crash scene.

Viewing the developed film, engineers saw the shadow of the vertical stabilizer and rudder racing erratically back and forth on the left horizontal stabilizer. By duplicating the shadow on a scale-model F-100 and making it perform the same actions as observed in the film, they saw that they could create the tail section's behavior. They got the known bearing and azimuth of the sun at 11 a.m. on October 12. With a slide projector serving as the sun in that position, and a protractor to set the heading and dive angles of the plane, the engineers worked the model through the gyrations the real tail section had performed 20,000 feet in the air. In this way they could verify many conclusions.

Project Engineering studies indicated that neither the hydraulic nor electrical systems had failed. The stabilizer was in the correct position and the landing gear was up and locked. The way the rotors were bent showed that the engine had been rotating when it hit the ground. Lab tests indicated that the engine had been running under full after-burner at the time of the breakup.

The most reliable clue as to the primary cause came from oscillograph records—light beam tracings on photosensitized paper that reveal actual control forces (the control stick and rudder pedals) and positions (such as those of rudder, stabilizer, and ailerons) at any given time. Though lightstruck, the film was salvaged through delicate developing operation by the photographic laboratory. The film showed to aerodynamicists that Welch had encountered an unexplainable phenomenon which probably had caused the breakup. This unforeseen action was a high, nose-right yaw in which the airplane rotates around a vertical axis drawn up through the center of its fuselage.

The exact degree of yaw experienced during Welch's dive is secret, but we can say it was considerable. This is what was finally believed to have caused the accident.

To understand why a variance from the designed attitude of the plane can cause it to break up, one must remember the tremendous speeds involved in supersonic flight. Imagine a stream of water from a hose. Let a knife blade in the stream represent the F-100. When the blade is held edgewise no effect is felt from the force of the water. But when the flat of the blade is turned into the stream, the force on it is terrific.

The investigation of George Welch's last flight is not over. The conclusions reached in the 3,000 man-hours devoted to the study to this point are considered merely the beginning. But because of Welch's priceless contribution we are now aware of some of the new problems. We have tangible evidence to work with. The future of all of aviation owes George Welch a debt of gratitude for leaving us this insight. •

Lab tests proved that the engine had continued to function after the breakup.

Security investigators combed the desert ranchland for eyewitnesses of fatal crash.

This month's

BRIGHT IDEA

RADAR-LITE

Twin six-volt batteries and battery case are one replaceable unit in this powerful new utility lamp.

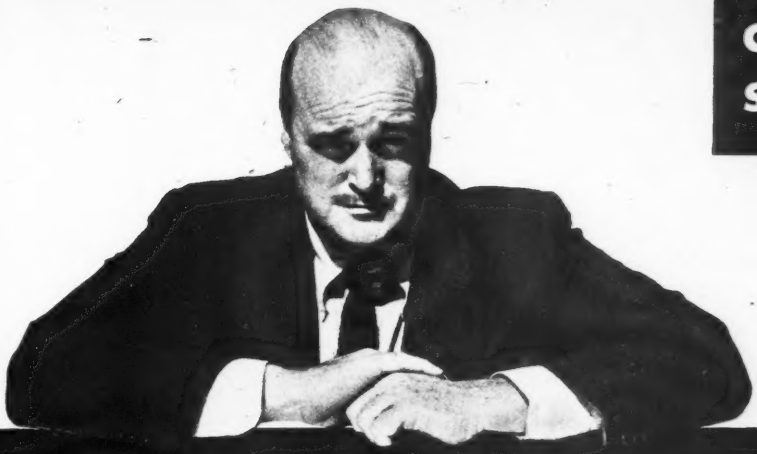
THIS month's Bright Idea will brighten some of life's darker moments for home-owners, workmen, motorists and sportsmen. Radar-Lite is an all-purpose trouble light that will give you all the light you need (40,000 candlepower) and very little trouble keeping it in running order. Big feature of the Radar-Lite is the one-piece battery and battery case. The bulbs, lens and handle are in one unit which attaches to case easily and quickly with screw caps. •

WIN $50

Dreamed up a neat gadget? If you're pretty keen about that pet project of yours, get busy and work it out in your shop. Then send pictures and a description of your invention to the Bright Ideas Editor, Mechanix Illustrated, 67 West 44 St., New York 36, N. Y. Each month the best entry gets a cash prize of $50.

Blinker taillight, which also flicks up to serve as all-around warning, is visible for half a mile; the big headlight penetrates an equal distance. Screw caps attach lamp to battery. Burgess Battery Co., Freeport, Ill., developed Radar-Lite in their laboratories.

COVER STORY



Tom McCahill Looks Over The 1956 Cars

MI's famed car critic presents a preview of the first batch of new cars released for publication. Don't miss the December MI for a look at more makes and models.

CHRYSLER

Chrysler Corporation

FROM the glamorized Plymouth right on up to the Imperial, the 1955 Chrysler line was entirely different. The overall change was miraculous. Chryslers have always been good cars but many a moon had slipped over the mountain since they could be considered great. The 1955 offerings were close to great. In every division they had the hottest offerings in two decades and they could have stood pat with these until well into 1956. However, getting the taste of blood for the first time in years, the young, new Chrysler quarterbacks elected to stop right in the middle of success and whip out a brand-new line for '56, long before the football season had progressed to maturity. Let's take a look at them:

All Chrysler cars this year will feature 12-volt electrical systems. The PowerFlite transmission on all of the Chryslers, which last year featured a shift lever on the dashboard, now is operated by pushbuttons, also on the dash. The big car of the CHRYSLER division, the New Yorker, has upped the displacement from 331 cubic inches to 354. The smaller Windsor has the 331-cubic-inch engine the New Yorker and the Imperial used until now. The compression ratio of the smaller engine has been raised to 8.5 to 1 from 8 to 1 and the compression ration of the bigger engine is a straight 9 to 1. The Chrysler looks have been altered some-

DE SOTO

Chrysler Corporation

what—in fact, quite somewhat. The front end now seems to be thicker from bumper bottom to hood top and the tail fender line has a slight pigeon-tail upswing. These new Chrysler cars, which belted the Top Two around pretty hard in '55, will undoubtedly continue their sales trend upward, as they are quality buckets from the bolts that hold on the rear bumper to the bugs that collect in the grille.

DE SOTO for 1956 has been given the wide-tail treatment, some chrome juggling and sharper all-around good looks than it had in 1955. The big news at De Soto is an increase in engine size from 291 cubic inches to 330, which makes it just one cubic inch smaller than the famous Chrysler engines Briggs Cunningham used at Le Mans so many times and which powered the '55 Chrysler 300. In 1955 De Soto was the Under-300-Cubic-Inch champion for stock cars at Daytona Beach when it averaged 112 mph. With this new tail-twister it should prove quite a performing car and I hope to bring you a real test of it before long.

One novelty which De Soto introduces this season is in the tail fin department. The '56 cars have enormous fins and from each of them sprouts not one nor two but *three* lights, including a white back-up light.

DODGE

Chrysler Corporation

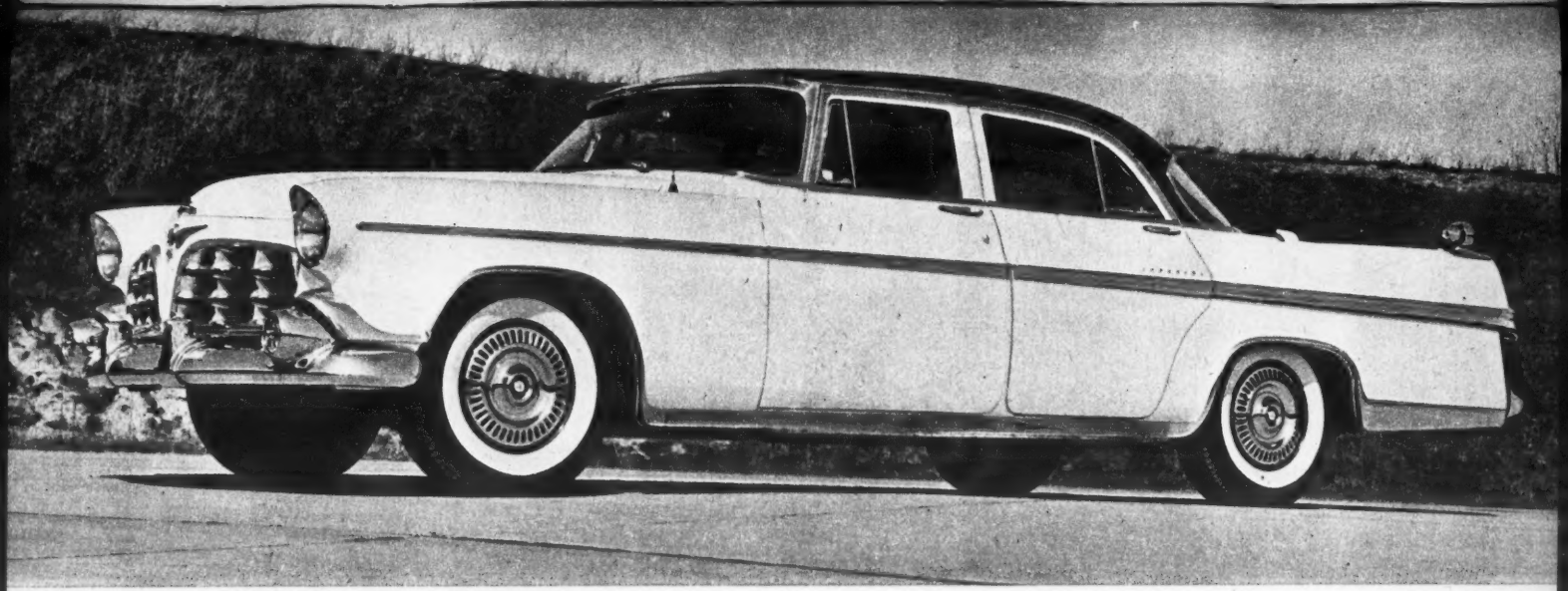
DODGE for '56 has the so-called barracuda profile with a mermaid tail-line that starts at the doors and gives the appearance of gently sweeping upward. Through the aid of chrome strips this is accentuated so that at a quick glance the new car closely resembles a guided missile. The new Super Red Ram engine has been enlarged to 315 cubic inches while the plain Red Ram is being kept at 270 cubic inches, the same as in '55.

I have owned a '55 Dodge station wagon since they first came out. I never fully appreciated it until Hurricane Diane (which was rated "unimportant" by the U. S. Weather Bureau) disagreed with the learned weather forecasters and sloshed us with the biggest flood ever experienced in the East. I was in Philadelphia that night and headed for home when all hell broke loose. It took me six hours to make the 50-mile trip. Much of the time I was driving in two feet of water.

If Bill Newberg, Dodge's prexy, had been building boats instead of automobiles, he couldn't have done a better job. The Dodge was as dry as a W.C.T.U. convention. Brother, how I thanked those ignition drown-out tests they run at the Chrysler proving grounds. More water got in my en-

Diane (which was rated "unimportant" by the U. S. Weather

the Chrysler proving grounds. More water got in my en-



IMPERIAL

Chrysler Corporation

gine room that night than you'll find in the average Hollywood swimming pool—but the Dodge never missed a beat.

Last year's Dodge cars were considered by many to be the looks king of the road. In '56 they look even better.

Speaking of looks, I rated last year's Chrysler 300 the finest-looking car in America, bar none, though the IMPERIAL got the nod as the deluxe king of the entire Chrysler line. The Imperial is a lush wagon of great comfort and ability that packs enough horsepower to fell the Super Chief with one blow. Price-wise, the Imperial is the top layer of the sandwich that encloses the 300 between it and the New Yorker. The '56 Imperial boasts a revised Hotchkiss drive for better handling and cornering. The rear fenders have been swept up and that distinguishing and (to me) silly taillight still remains. The wheelbase has been increased three inches and the overall length has gone up five and a half. Chrysler claims the new Imperial is now more than 20 feet long. This is not an improvement in my book. But it's a fine car nevertheless.

Like the New Yorker, the Imperial has had its displacement upped from 331 to 354 cubic inches and now has a potent 9 to 1 compression ratio.

PLYMOUTH

Chrysler Corporation

LIKE all other Chrysler products, PLYMOUTH, the breadwinner of the family, has beefed up the engine room by adding more cubic-inch displacement for '56. From 260 the new Plymouth mill goes to 276 cubic inches, four more than the Red Ram engine which powers my '55 Dodge station wagon. Seeing the writing on the wall, in the form of what its two closest competitors did last year when they stuffed more muscles under the hood, the Plymouth brass has decided to make a pitch for the performance market. Though I haven't tested the car as yet, with this new engine it should be a well-qualified bomb.

Also like the big Chryslers, Plymouth will feature a dashboard-located pushbutton gadget for operating the Power-Flite transmission. In 1955, Plymouth made a big thing of the fact that it was longer than either of the other two cars in its price class. The trend continues. This year's overall length has been increased by one inch, while height and width remain the same. In looks the main change has been adding fins to the rear fenders. A 12-volt electrical system and a newly-designed safe-lock door latch to keep the doors from flying open on uninvited impact with stone walls and similar objects, are other new features for 1956.

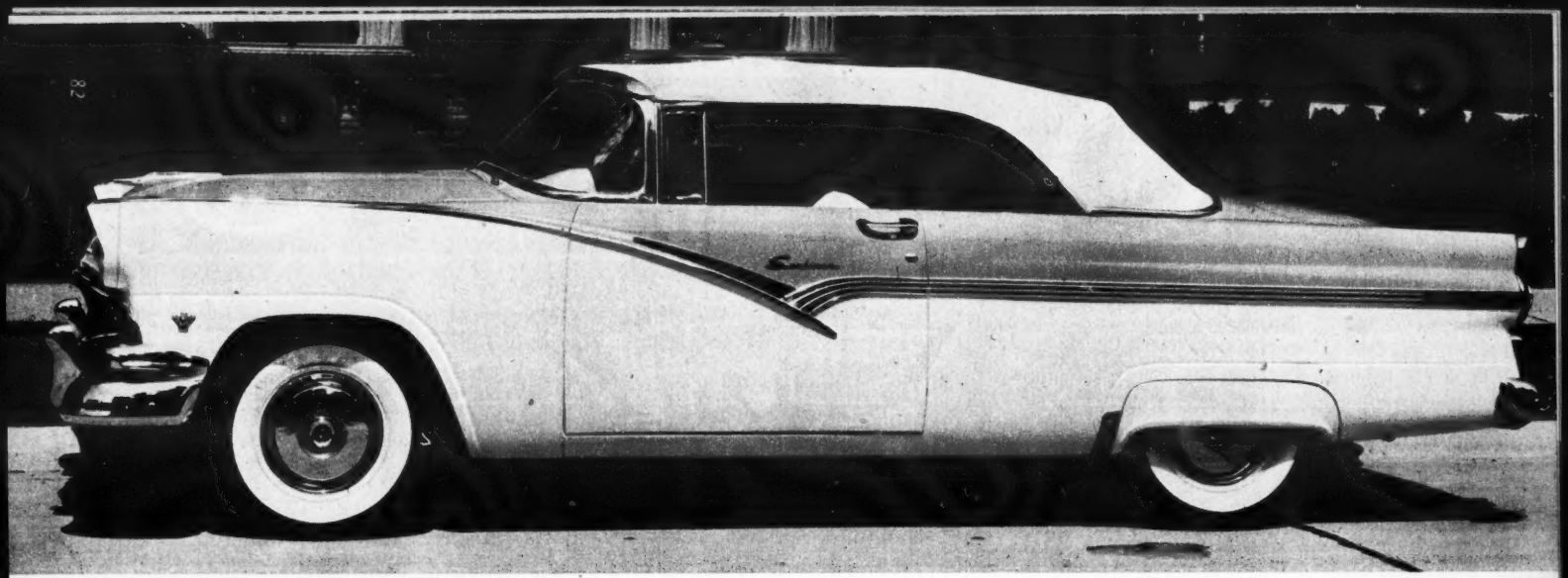
CONTINENTAL

Ford Motor Company

THE Ford Motor Company, under the guidance of Henry Ford II and employing enough engineering and design shock troops to man a banana republic army, shows signs of bearing down on the competition in '56 with more vim and vigor than ever before. Never have the Boys From Dearborn had as much or as potent ammunition as they have arrayed for the coming sales battles.

The king of the Ford line is the new CONTINENTAL, the first really high-class-all-the-way-through car built in America in many years. If you have wondered what happened to all the real chrome they used to put on automobiles, it's back. The sparse quantities used on this car are the first to come out of Michigan since Governor Soapy Williams' grandfather started shaving. Without the aid of phony geegaws or Coney Island tinsel, Bill Ford's Continental Division has fielded a truly great car.

The Continental, which looks to me like a big, fully-deluxed, four-passenger Thunderbird, should fulfill the fondest hopes of the "Why don't they bring back the old Continental?" set. [*Continued on next page*]



FORD

Ford Motor Company

The Continental is powered by a huge, 368-cubic-inch engine reputed to put out 400 foot-pounds of torque. According to Ford's abacus-manipulators, this powerhouse develops 285 hp. Basically, the engine is the same one used in the '56 Lincoln. Then what makes the Continental such a choice item? The refinements in upholstery, the magnificent paint job and the discreet use of real-McCoy chrome all smack of quality that left our home scene the last time Buffalo Bill and Annie Oakley vied for shooting-iron credits at the old Madison Square Garden. This is for the guy who wants the best. It will stand out from the other cars in a parking lot like Prince Valiant on his white charger surrounded by street hooligans dressed in space helmets and zoot suits.

The '56 FORD, which I test on pages 92-95 of this issue, once again is available in many flavors, shapes and sizes. As this picture and those elsewhere in the magazine show, styling changes have not been very drastic. The big deal for those who like real gutty performance is the new Fairlane series, which has last year's Thunderbird engine brought up to date. This is quite a package. It will enable you to turn 0-60 in 11.8 seconds, or maybe even a little faster.

LINCOLN

Ford Motor Company

POWERED by the same 285-horsepower engine used in the Continental, the 1956 LINCOLN has been stretched in length and width to please the most sensitive lower-back area of the country's most critical dowager duchesses. This has been done without losing the old road feel of the past. It is not the way I like my Lincolns but the new cars will have twice the appeal, for twice as many people, as ever before, which is what counts when a company is making bank deposits. With its huge new engine, the '56 Lincoln gets down the road in well under 12 seconds for 0-60, while affording all the drawing room comfort of a swanky gin mill.

It is obvious that Lincoln is going after the big car trade with a really big car. Overall length has been increased seven inches and is now a little over 18½ feet. Yet the car corners better than last year's model and will do an honest 112 mph. As I pointed out in last month's road-test report, the new Lincoln will "out-fanny any car on the block." To accomplish this while creating a Gargantua eligible to compete in anybody's Biggest Car Contest, was no mean feat of engineering and I tip my hat to Lincoln's slide-rule jockeys. The '56 cars of course offer the same safety features of the rest of the Ford line, including optional safety belts.

MERCURY

Ford Motor Company

MERCURY for 1956 is the hot-shot wildcat of the Ford line. It is now powered by a 312-cubic-inch engine that can whip it away from traffic lights like a gazelle and has a top speed of close to 110, even with MercOMatic transmission. The body shell and interiors are similar to the '53 and '54 Lincolns, brought up to date with wrap-around windshield, tubeless tires, 12-volt system and—like all Ford Motor Company products this year—a five-part package of safety devices aimed at reducing passenger injuries in case of accident. This includes a deep-center steering wheel which gives way slowly on impact, optional seat belts for front *and* back seats, safety door latches, safety rear-view mirrors with a special backing to discourage the glass from popping out, and crash cushioning for the instrument panel and sun visors.

Based on previous records, I think that percentage-wise the '56 Mercury will be Ford's selling star. They are sensibly-sized cars, the way I like them—big enough but not too big—and with all the performance anyone could want. The Mercury has looks, comfort and handles like a competition Mexican Lincoln. It's my bet that the public will go for it like an Irishman after a slab of corned beef.

CADILLAC

General Motors

ONLY two of the five General Motors cars have been officially announced at this date but let's take a look at them.

First, Congratulations to CADILLAC! The 1956 Caddies are from two-and-a-half to five inches *shorter* than they were in 1955! This is a real advancement toward safety through better handling. While Cadillac's competitors—who have been copying them for so many years—continue on a glandular spree, bragging about their tremendous size *increases* for next year, the car that started the how-long-can-you-make-'em? craze has made a complete turnabout.

In addition to this smartest of smart moves, Cadillac claims 285 horsepower for its all-new regular engine and 305 hp for the Eldorado series, both of which displace 365 cubic inches and have a 9.75 to 1 compression ratio. Cadillac now boasts an 18-inch-wide brake pedal, power brakes as standard equipment and a tricky outside mirror that can be adjusted from inside the car. The familiar egg crate grille has been rejiggered, the headlights re-shaped, the bumper guards (or Dagmars) blunted, and the side panels re-worked. The HydraMatic transmission has been improved, they say. This sums up Cadillac for '56.

PONTIAC

General Motors

THE 1956 PONTIAC line is topped by a big 316.6-cubic-inch, 227-horsepower V8 engine equipped with a four-barrel carburetor, which powers the new Star Chiefs. The smaller Pontiacs have a 202-hp mill with a two-barrel carburetor. You can still buy a Pontiac with a synchromesh transmission, instead of Hydramatic, but the gearstick jobs are penalized at the factory by lower compression engines. The big StratoStreak engine, with its 8.9 to 1 compression ratio, should really whip these feather boas down the road like Halley's comet.

This year Pontiac also has a four-door hardtop (shown above), a model which promises to replace the old sedan design in all makes within the next two or three years. The chrome treatment has been somewhat conservatized for '56, though the double-breasted stripes are still on the hood. I have always felt that over-chroming the Pontiac, one of the best-looking cars on the road, was comparable to putting polka-dot lipstick on a glamor girl.

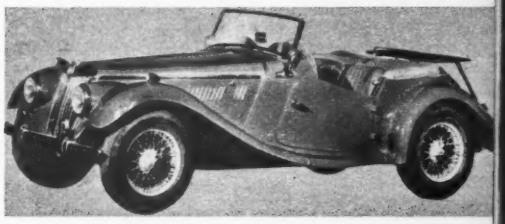
This Pontiac, GM's pitch to the middle-income group, is a sturdy, well-built automobile loaded with comfort features for a coast-to-coast junket or a fast trip to the beer hall. These are good cars and should appeal to all Pontiac fans.

Meet The New MG

Longer and lower but no wider, MG-A looks much bigger than its predecessor, the MG-TF.

Completely remodeled, the new MG can now top 90 miles an hour!

By Gordon Wilkins



MG-TF with sweeping fenders, angular outline, is one of most popular sports cars.

WHEN the last MG-TF rolled off the production line in the early summer of this year, an era ended in sports car design. The stark angular outline, the long sweeping fenders, the slab-sided gas tank and the spare wheel hung on the back, had their origins in sports cars which made history at Le Mans back in the '20s. It was a formula which produced a long line of durable, inexpensive sports models and spread an appreciation of sports car motoring into areas where people had long forgotten that cars could be fun to drive. But rising performance standards brought the MG hard up against the laws of aerodynamics and above 85 mph increases in power brought negligible returns.

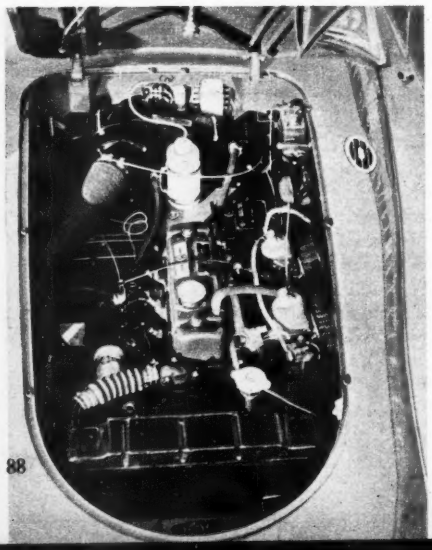
Cost and weight of a streamlined model presented problems that had to be solved if the MG was to remain one of the most popular sports cars. The new MG-A two-seater now goes on sale with a successful Le Mans debut behind it, with more power and only a trifling increase in avoirdupois. At this writing the price has not been set but it will probably be slightly higher than the MG-TF.

The type designation is significant in two ways. The Magnette sedan is the ZA, so a new alphabet, prefixed with the letters MG, begins with a new body style and starts a whole new line of cars. For a long time MG owners have had little more than the achievements of the

Wheelbase is same but length is up nine inches and inside width—48 inches—is roomier.

special record cars to remind them of the make's racing history. But now the British Motor Corporation is stepping up the competition on all fronts. Not for 20 years has there been such intense activity as is now to be seen in the big new shops at competition headquarters. Mechanics work early and late on new projects; next year's racers, of sensational shape, have already completed their wind tunnel tests and their engines are installed for current road tests.

New B-type 4-cylinder engine delivers a maximum 68 brake horsepower at 5,500 rpm.



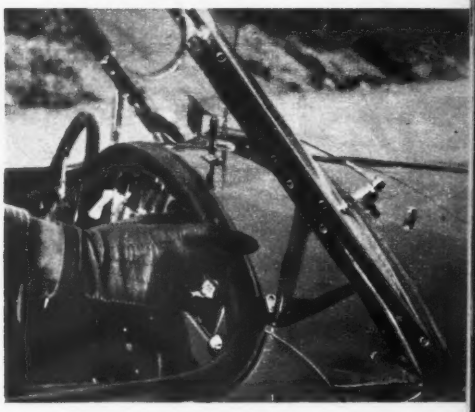
The old line of MG's, from the J2 of 1932 to the MG-TF 1500 of 1955, saw a power increase from 36 to 64 hp, or to over 80 if we include approved tuning stages, and they remained fundamentally safe, tractable and economical. The new car, therefore, had to be designed with equally large margins for development, so the chassis was given a secret try-out on the streamlined record car in which George Eyston and Ken Miles set the salt sizzling at Utah in August 1954 to establish 35 new U. S. and International Class F records at speeds up to 153 mph. Its quality was confirmed at Le Mans this year when two MG-A prototypes finished 12th and 17th, the faster covering 2,082 miles in the 24 hours.

The production model looks a bigger car than the MG-TF; longer, lower and wider. Actually, the wheelbase is unchanged, length is up 9 inches, height is down 2½ inches and rear track is slightly reduced. There is much more width inside the body—a total of 48 inches across the seats. External width is an inch less than on the MG-TF.

The new, more rugged frame, has box section side members swept out wide, so that the seats can be set low down between them but driving vision is still excellent over the sloping hood, and both front fenders are visible. In comfort and weather protection, in greater space for passengers and luggage, the new shape brings real advantages. There is more room to turn the new four-spoked flexible wheel and more room for the feet. Twin separately adjustable seats have deep, curved back rests for support on fast corners and there is a comfortable arm rest between them. Big parcel containers now figure in the doors and there are no projecting locks to catch the knees. Main instrument dials are brought back in front of the driver and the long- [*Continued on page* 214]

Permanently attached leather cloth envelope behind seats stores two side screens.

Spare, tools, go in tail but there's still room for two good-sized cases, packages.



Supports for full-width curved windshield are also designed to act as grab handles.

Simple dash features speedometer, tachometer, oil pressure, gas and water gauge.

Spring loaded flap on side screens opens for hand signals, closes firmly afterwards.

Catering to the interests of your new car will give you miles of pleasure at the wheel.

HOW TO TAKE CARE OF YOUR NEW CAR

By Frederick C. Russell

It needs different treatment and less pampering than your old one.

"HERE are the keys to your new car." Magic words. Your smile is a yard wide as you take the keys that unlock the most highly charged package of transportation in all automotive history. Perhaps this isn't the first time you've had the thrill of owning a new chariot—and that's just the trouble. The gadget these keys unlock needs a new type of care and attention.

And when I say that your sleek beauty needs less pampering I do not mean that the new rules are not pretty strict. These days you can kill a new car with misplaced kindness, like a friend of mine who ran his job so tenderly the piston rings failed to wear in properly. The dealer replaced the rings free of charge but this didn't compensate for a lot of trouble and inconvenience.

I like Ford's suggestion to make 50 mph tops for the first 500 miles; then 70 (where regulations permit) for the next 500 miles. Plenty of up-and-down speed but no sustained high speed. Most car manufacturers also stress watching the motor temperature gauge. If it starts to climb, ease off. If this doesn't check the temperature rise, better stop and investigate.

But this, too, calls for new methods. If you check the water level you will break the pressure cap's seal and forfeit temporarily the advantages of higher pressure which raises the coolant's boiling point. So with the engine switched off, check the fan belt's tension and then the oil level. Many new engines are filled with break-in oil for the first 300 miles. This oil is more likely to burn off because of the up-and-down driving. If there is no obvious reason for the way the temperature gauge persists in climbing then carefully check the water level. Give the radiator cap a partial turn until the pressure vent opens, wait a moment or two and then complete removal of the cap. This will prevent scalding if the cooling system has overheated.

Following a sudden stop the light for the oil pressure may flicker on and off. During idling the light which replaces the ammeter may start flickering. All this is normal enough and no cause for concern. If both lights go on when the car is standing in traffic, the engine has stalled.

If either or both of the lights go out when the car is running there's trouble and you'd better pull over to the side of the road and stop. When the "gen" light stays on, the generator may have stopped perking. It could also mean trouble with the generator regulator. Oil pump failure is the usual cause of continued lighting of the oil pressure tell-tale but it could also indicate an oil leak.

If I were taking delivery of a new car I would be especially careful to check the oil filter which may have a slight leak around its cover gasket. This wouldn't be so easy to remember because the chances are that the filter would be in some highly inaccessible spot.

Few wheel twirlers realize that the newer engines can be handicapped by outmoded ways of starting. A good general rule today is to push down all the way on the accelerator pedal for a cold start. This actuates the carburetor's acceleration pump, sending a slug of raw gasoline into the intake manifold. It also sets the fast-idle control where there is provision for such a feature. Then immediately back off on the pedal until the throttle is roughly one-third open. Hold it in this position while turning the ignition switch to the cranking position.

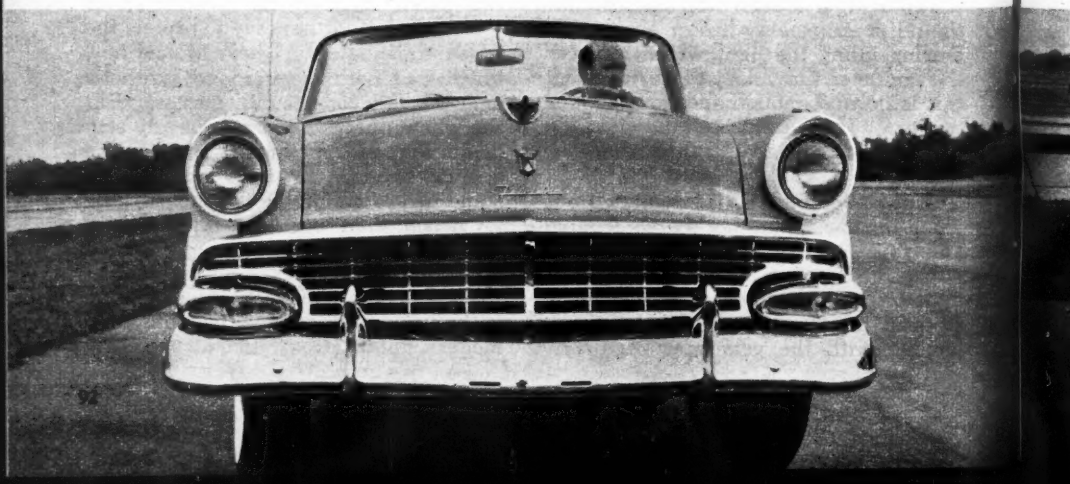
For a re-start after the engine has warmed up, or if the engine has flooded during a cold-start try, go down slowly on the accelerator pedal until the throttle is wide open and then crank. This process clears the cylinders, allowing the pistons to draw in more air for a mixture lean enough to fire.

What should be done to maintain the car's showroom complexion? There is so much in the way of conflicting opinion here it is like getting into a political argument. We know, for instance, that some car makers warn against waxing the finish until it has a chance to weather a bit. Others say to protect the finish immediately. I have waxed new finishes of both lacquer and synthetic enamel with conspicuous success. But the whole question today is purely academic for most car buyers because the chances are that the new car has been standing around on the dealer's parking lot longer than was good for it. So it would be foolish not to wash, polish and wax your new possession just as soon as you are handed the keys. An exception is the wood-grained steel paneling on a modern station [*Continued on page* 217]

Uncle Tom and lineup of new Fords whose big pitch is safety this year: optional safety belts.

The '56 Ford

Snazzy Sunliner convertible will boast a 1955 Thunderbird V8 engine that has been honed up



door locks that won't fly open in crash, and steering wheel that collapses slowly upon impact.

These are truly great cars, the finest Fords ever built, says Tom. They should prove to be among the best performing cars on the road.

By Tom McCahill

FOR 1956, Ford is fielding a family car that'll be a real high-performance, high-powered bomb. The horsepower race has invaded the low-price field with all the fury of a starved wildcat thrust into a cage of Easter bunnies.

Though I have no way of knowing for sure, I feel that Ford management called up the first team of engineers and asked, "Have you guys been reading those Other Car ads, the ones that tell about

to 200 horsepower plus a pony or two, says Tom, as will all cars in luxury Fairlane series.

Tom claims Jim McMichael, catcher's mitt, 1,825 flannel trousers will fit in trunk.

Body has basic '55 shell, Tom says, with some chrome juggling, new paint schemes.

Air-conditioning unit located under hood is where it should be, according to Tom.

their racing success?" Anyhow—the top Ford this year, the Fairlane, will have the '55 Thunderbird engine, which in effect is the '55 Mercury engine. Even this potent mill has been sharpened to a point where the horsepower will be 200 plus a pony or two. This means that the 1956 Ford should prove one of the finest performing cars on the road—and with a stick shift, it should be pretty sensational.

As you old readers may remember, I took Ford to task several times in the past for not making its most powerful engine of last year available with the manual gearshift. There were no manual-shift, big-engined Fords available for my '56 tests when I ran the cars at Dearborn. So I went all the way to the top brass and told them what I thought about it. I was informed by some pretty influential people that in 1956 you'll be able to buy any Ford with any engine and any transmission including a Mississippi paddle wheel, if you so desire. As this is being written a month ahead of the official introduction date, it is quite possible for any policy to be vetoed during that period. But I doubt if this one will be. Sight unseen, and naturally untried, my bet on the 0-60 time of the new Ford with full-sized engine and gearshift will be under 10 seconds. With the FordOMatic transmission, which is the rig I tested, this job is still a sensational weed-flattener, turning the 0-60 mph in 11.8 seconds.

My tests on the '56 Fords were concentrated on the new, big Fairlane series. The less expensive Custom models have a V8 similar to last year's big Fords, displacing 272 cubic inches, and they are still building the ever-popular Six. The Fairlane I tested had a 292-cubic-inch engine with enough torque to yank an elephant through a keyhole by the tail. Some readers may say, "Why so much engine for a general-use family car? Who needs all that power and stuff, anyhow?" As we have pointed out in these pages through the years, given a similar load to push through the air at any given speed, a big engine will always do it easier than the smaller engine.

We've all been fed to the gullet with

Roadability of new Fords is truly great, due to ball-joint suspension, the old master claims.

thousands of articles about the "killing horsepower race" and similar preachings. To a small extent, some of it has been true. But a big engine *is* an assurance of extra torque and thus greater safety in a pinch. It is as plain as the nose on Durante's face that, barring war or some other national calamity such as galloping dandruff in the Sioux Indians, thousands of miles of new super highways are in the offing. When these become a reality, the safe cruising speed of all cars will be upped and any car that can't do 75 mph for hours on end will be as obsolete as a 6 to 1 compression engine.

One of my main hates in the automobile business is the endless struggle by the industry to make cars bigger and bigger, apparently to please the type who would buy an oil painting according to how much wall space it covered. I must, however, concede that within definite limitations size is needed by the typical American family which does more traveling over the road in a single year than the average European family does in a decade. For example, a long motor trip in Europe would be 400 or 500 miles. In America, hundreds of thousands travel each year by car to Florida from Maine or Illinois for extended stays, or coast to coast, and they take everyone along with them from Herman the Cat to Aunt Lulu, the Backseat Univac. Today's Ford is an ideal size for American life. It has enough storage space to pack Jim McMichael, a catcher's mitt and 1,825 pairs of gray flannel trousers, size 38. If cars must be bigger than this, then the family should reduce, [*Continued on page* 221]

Luxurious upholstery in myriad of colors is standard equipment in Fairlane cars.

Potent new mill with stick shift should make Ford pretty sensational, opines Tom.

MI PIN-UP CAR

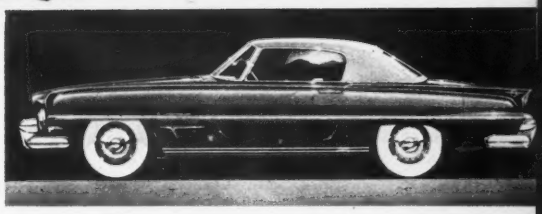
1906 SEARS

Owner: Byron Klepinger, Greenville, Ohio. Engine: 2-cylinder, flat opposed, located under floor boards. Car is driven by throwing in clutch and holding it in, which throws rear driving wheel against flywheel and then propels car via chains on each side to rear wheel. Top speed: 25 mph. Color: Body is black with yellow stripes, frame and wheels are painted red.

New American Sports Car

Prototype, above. Production job, below, has fender fins and wraparound windshield.

The Firebomb, a sleek four-passenger sports car, is now being produced by Detroit's Dual-Motors Corporation.



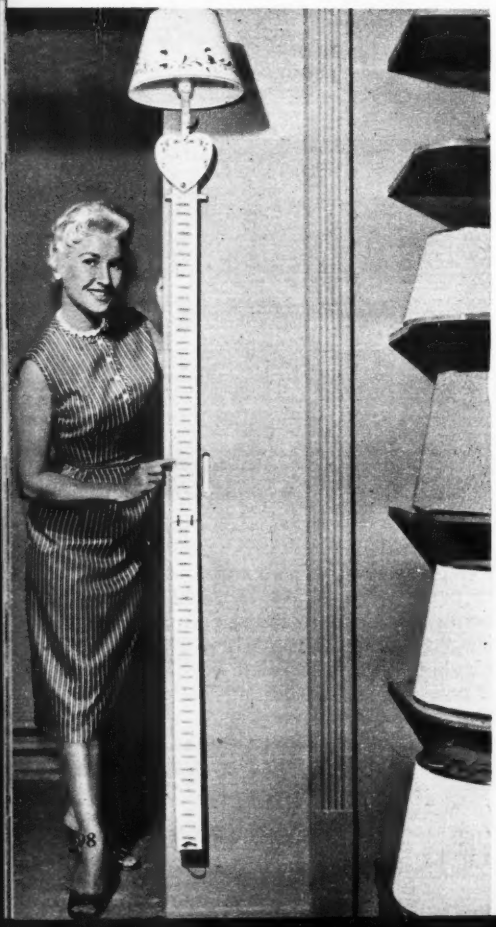
A UNIQUE four-passenger sports car dubbed the Firebomb and ranging in price from $5,500 to $6,000 is now being produced in limited numbers by Detroit's Dual-Motors Corp. The jaunty Firebomb has a 115-inch wheelbase and is powered by a modified Dodge Super Red Ram V8 engine with automatic transmission and power brakes. Its production body, designed by Carrozzeria Ghia, is assembled in Italy. •

WIN $25

You can plunk $25 in the family bank account if you send in a good, recent photo of an old-time car posed with the owner or a pretty girl. Car can even be new—if it is unusual. Include a self-addressed envelope (just in case) with all the vital statistics about car and owner to Pin-Up Editor, MECHANIX ILLUSTRATED, 67 West 44 St., N.Y. 36, N.Y. You may win that $25.

HYDROFOILS in kit form are easily installed on almost all outboard craft from 12 to 16 feet. Safe, smooth, they literally make boat fly. Atlantic Hydrofin, Miami, Fla.

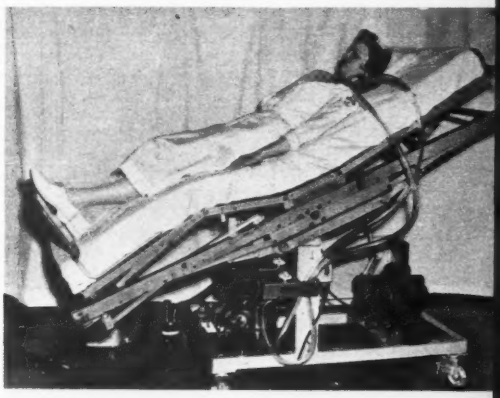
GROWING UP LAMP'S base has yardstick with spaces for marking date, weight, height of little Oscar, who likes to see how much he "growed." Device was exhibited in Chicago.



IT'S NEW!

SLIT SPECS, originated by the Eskimos, are considered the most on Canadian ski slopes these days. Glassless, slits guard against sun's glare. This pair costs $20.

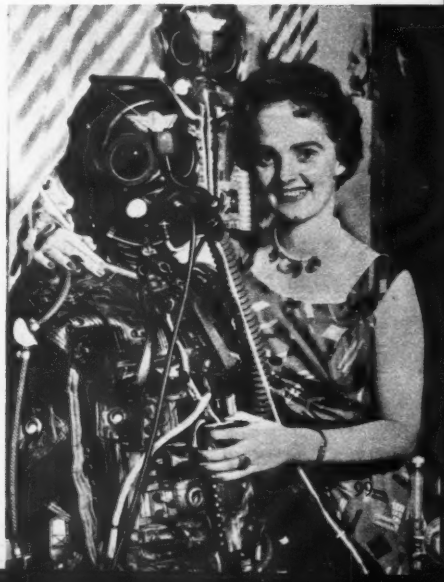
ONE-MAN HELICOPTER developed by Goodyear Aircraft Corp. and designed by Paul Ziegler, weighs slightly over 400 pounds and is capable of more than 60-mph.



ROCKING BED equipped with bellows is tested as possible replacement for iron lung in Chicago trial. Rhythmic see-saw action of bed acts on bellows, supplies oxygen.

BICYCLE CART made from two standard bikes is going over big in Brunswick, Germany. Assembled in five minutes, it totes two, tot, luggage. Frame costs $15 to $20.

GOGGLE-EYED flight suit will protect its wearer for 80 hours at 100,000-foot altitude, according to University of Illinois tests made for the Toronto, Canada, manufacturers.



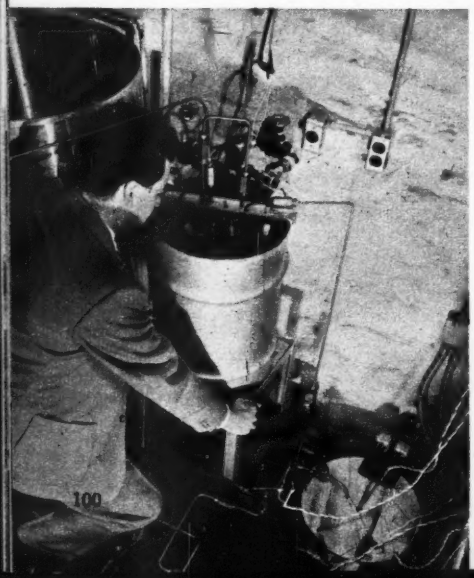
HIGH FLYING Jean Boulet gets handshake after cracking world's helicopter altitude record in this 400-hp French job, Alouette II. He went over 27,000 feet to set mark.

AIR CAR FLOPPED in attempt to fly without wings. Built by Charles Pritchard, Emporia, Va., short-finned ship hit 50-mph but couldn't get off ground. He'll try again.

SCALP TITILLATOR raises hair on cranium's bald spots via massage, claims inventor Tony Voitechovsky, London Curly Boys President. Hopefuls are shown "cultivating."

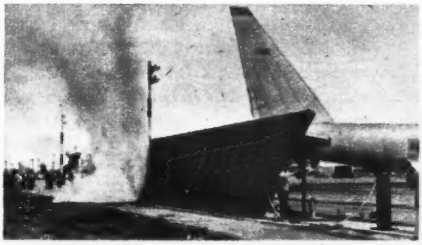
NO SALT wanted here. Gregory Laserson operates experimental distillation unit for taking salt from sea water in quest by U. S. for a practical method to aid dry regions.

TOUR-A-TENT provides room for two adults to snooze comfortably on inner spring mattress. Made by Gibbons Supply Co., Birmingham, Mich., it fits atop most autos.

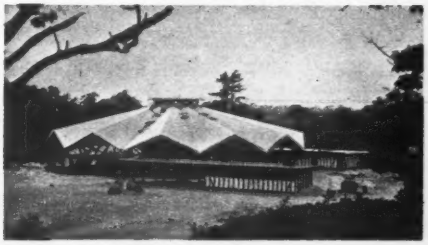


CURBSIDE HEATER keeps car's motor warm for winter starting in Solna, Sweden. Electrical outlet resembling parking meter connects to heater under hood. Cost: $20 a year.

MOVING SIDEWALK built by Hewitt-Robins of Stamford, Conn., goes around corners, can also haul passengers in two directions. Three units are slated for Texas air terminal.



BLAST FENCE designed to dispose of jet air turbulence at Boeing's Seattle plant deflects the blast upward at angles of 85°.



STEEL DOMED theater being built at Beverly, Mass., has canvas sides which can be raised in good weather. It seats 1,300.

NON-LOSEABLE GOLF BALL contains tiny radio broadcasting set, sends out signals picked up by transistorized receiver at left. Motorola-made gadget is not for sale.

BUDDIES. U. S. Army scout dog and his handler peer out through protective masks during mock gas attack in Germany. Army rates canines so high they issue them gas masks.

money-making IDEA

He Lined His

Bob Rice advises breeders to cash in on America's newest big profit fur industry—those easy-to-raise nutria.

By Weldon D. Woodson

BACK in 1952, 31-year-old Bob Rice, industrial engineer of Arcadia, Calif., and his 23-year-old wife, Betty, a secretary, peered in a fashion trade magazine spread out on their dinette table. "Well, what do you think?" Bob asked as he closed the magazine.

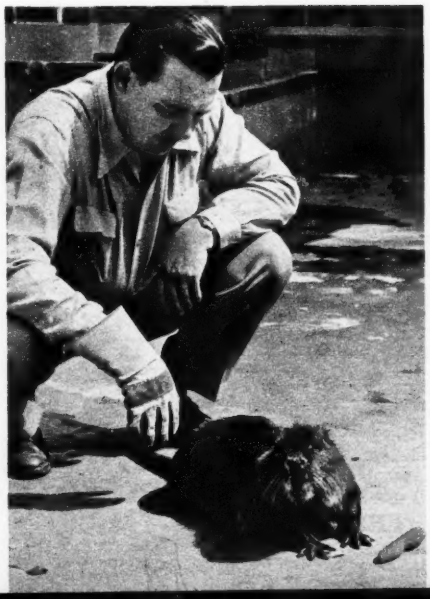
"It's nutria," said Betty.

"Agreed," said Bob.

For some time they had been looking for some way to supplement their salaries. As soon as they started investigating the possibilities of farming fur-bearing animals they could not help but note the prominent place given to the South American nutria—right up with top-rung mink.

As the Rices discovered, the nutria business is not one of those pie-in-the-sky propositions. Nutria coats have

Bob Rice, pioneer U. S. nutria raiser, and one of his 2,000 selectively-bred rodents.



Pockets With Nutria

been sold all over the world for generations. On a business trip to Dallas, Texas, Bob took a look-see in the swank Neiman-Marcus store. There he counted 200 nutria coats. The nation's metropolitan newspapers continually run display ads that feature nutria. Indicative of their quality, a full swing sells from $2,500 to $4,000 for ranch-raised fur. Wild nutria fur is cheaper and inferior.

With a final look at the apparel trade publication and making their decision to raise nutria, Betty insisted that she take her savings and buy the initial pair. Bob reluctantly consented. Today, the Rices own around 2,000 animals. As a clue to their wealth, they retail standard registered breeders at $1,200 a pair.

Visitors to the Rices' three-quarters acre back-yard ranch are surprised at the hodgepodge appearance of the creature, for so new is the nutria in the United States that few persons have ever glimpsed one. It possesses a beaver head with huge, orange-hued tusks, dinky, rounded mouse ears and walrus whiskers. Its front paws look like a monkey's; its hind feet are webbed. Its 24-inch body terminates in a long, coarse, hairy tail like a muskrat's, useful for swimming and for balancing. Rough guard hair clothes its body, but its underfur is exquisitely fine.

Scientists call it not nutria, but coypu (koi-poo); its Latin name is *Myocastor coypus*. But long ago the natives of South America christened it nutria, their word for otter. Although it reminded them of the otter, it is not even a cousin to this animal. But nutria became its accepted name among ranchers and furriers.

Nutria fur has been in vogue for over a hundred years. Trappers took so many that by 1900 the nutria was close to extinction. Then South American governments enacted laws to protect it. In 1920, for the first time, it was domesticated. Two years later, a group of Germans in South America established a ranch, Cabana Nutria Blanca. From its inception, it has meticulously culled its herds, breeding only impeccable animals with fur characteristics ea-

Betty Rice fondles newborn nutria. She put her savings into ranch's first stock.

No climbers, the nutrias can be kept in easy-to-manage pens of concrete block.

gerly desired by top-flight furriers.

Until several years ago, the South American governments prohibited exportation of the animals. With special governmental permission, Bob and Betty negotiated with Cabana Nutria Blanca for their foundation stock. Moreover, they received the right to give the name Cobana Nutria to their own ranch in Arcadia, Calif.

Although the standard color of nutria is brown, or as the trade calls it, "marrone," the South American ranch has produced rare albino-whites. This gave it its name, which means "House of White Nutria." The Rices' own pens house specimens with color descriptions like Midnight Mist, Imperial Black, White Sapphire, Champagne, Golden Sultana and Exotic Palomino.

In raising nutrias, Bob advises you to start with standard marrones, since they chalk up cheaper than mutations. He urges you to be skeptical of bargains which are usually low grade stock. Purchasers of his registered breeders at $1200 a pair can pay cash or buy on the installment plan.

With each pair bought, Bob gives a Gold Bond Certificate or contract, which, among other things, stipulates that breeders are insured one year against death from sickness or birth accident at full value, and for the second year on a fifty per cent basis. Furthermore, a buyer may at any time within two years from the date of the sale swap his young for unrelated babies of a different blood line or instead of exchanging, buy more nutrias at a reduced price. Should the animals not litter within eight months, the Rices will replace them with a proven or carrying pair of equal quality.

After the nutria breeder has built up his herd to 100 or more, he can cull his prime ones for breeding and appropriate the remainder for pelting. Bob has outlets in Los Angeles anxious to take quality pelts at approximately $30 per skin. Customers of Cabana Nutria, Inc., automatically receive one-year free membership in Cabana Nutria Breeders Association which maintains facilities for killing and pelting animals for between $2 and $3 per pelt.

Raised outdoors, the nutria requires neither temperature control, air conditioning nor close supervision. It is adaptable to almost any climate. Where

Domesticated nutria, or coypu, dines on mixture of grain feeds with carrots for a real treat. A swamp dweller, coypu will splash happily in any kind of pool.

there are cold winters, one merely unloads an armful of straw into its nest and it will burrow in for warmth and emerge at opportune times for its food. Of a placid disposition, it never develops a battle-scarred pelt. It seems to be immune to all diseases—the sole furbearer with such a record. It has no obnoxious odors from its body, nest box or pen and is church-mouse quiet.

The nutria is a prolific breeder, farrowing from four to eight kits per litter and averaging five litters in two years. It breeds in six to eight months. A year-old adult weighs from 20 to 30 pounds, but Bob has one Goliath that tipped the scales at an even 40. If one begins with a single pair, a scant 27 months later he should own easily around 90 animals!

To start a nutria farm all one needs is a back yard big enough for ten pens. Bob constructs each pen four feet wide, 12 feet long and three feet high. The sides are cement blocks, the floor, brick or concrete. Using cement blocks, he partitions off two feet in the rear of the pen for the nest, leaving an open foot-square entrance. He caps this with a hinged door which can be raised and shut by one stationed on the outside. Toward the front, he shapes a foot-deep, foot-and-a-half wide water trough equipped with a drain, since nutrias are semi-aquatic. The material for each enclosure costs him $16.80.

As a parent the male manifests paternal tenderness. With the advent of the babies—each fully upholstered with eyes open—he customarily visits the nest-room for an introduction to his offspring, although an obdurate male may pout outside until placated by the intermittent whimpering of his mate.

Within two days or less after birth, the young caper about and nibble solid food. The mother teaches them to swim and eat.

Nutrias should be weaned at the age of six to eight weeks. Keep weanlings in a special enclosure—up to 20 per pen —until they are four months old. Then segregate males and females until pairing them.

Bob and Betty are riding high on the nutria bandwagon. With the parade just on its way in the United States, they believe that by parlaying a pair into a sizable herd now, one can cash in on the beginning of a sure-fire, up-and-coming, big time fur industry. •

Three types of fur raised on the Rice ranch: White Sapphire, Standard Marrone and Golden Sultana. Marrone is the least costly, retails at $4,000 for a full coat.

"White Elephants" and donors, 12 couples in all, before drawing lots to see who gets what.

White Elephant Party

Junk room search by Bob and Appie Watkins unearthed 15-year-old feather duster. Dell O'Barr, center, got first draw. Flying wrapping, often five layers, added to the suspense.

Brass spittoon won by Eleanor Jacobs was admired for its beauty, lines, usefulness.

Snow shoes picked by Watkins proved a bit ironic—Camden is noted for balmy winters.

Beastly potluck choice was mounted fox which new owners don't seem to mind at all.

Elaborate wicker bird cage, complete with wicker stand, was the prize of Dell O'Barr.

There is only one drawback to this kind of affair: you may get back a worse eyesore than one you gave.

GETTING rid of unwanted household articles and having a good time to boot, was the purpose of a recent White Elephant Party celebrated by a group of Camden, S. C., Du Pont plant employes and their wives. The reason for such an affair is diabolically simple: find that awful gift your great-aunt Zenobia gave you a few years ago, gaily wrap it and bring it to a party where some unsuspecting soul will win it. There is only one drawback to this plan: what you win may prove to be more of a white elephant than what you gave! •

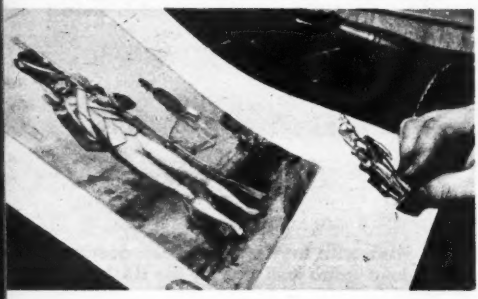
Photos from Better Living, Du Pont employe magazine.

Ornate vase with intricately formed design and dubious value was won by the Heckers.

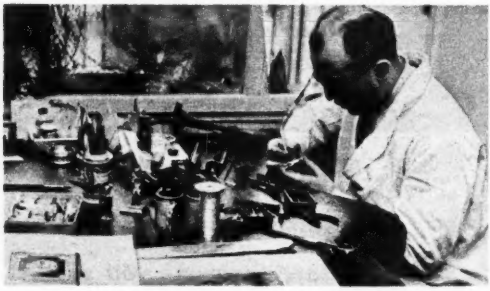
Fighting standard bearers from three eras: French, 1646; French, 1786; American, 1955.

Armies Made To Order

IN a tiny shop called *Les Drapeaux de France* in a quiet Paris arcade, Jacques Bittard creates miniature lead soldiers so perfect in every detail that they are sought the world over by collectors. Molded from a solid block of lead, each model's authentic look is achieved by use of delicate tools. Uniforms and weapons are cut and molded from separate lead sheets. Painting, a highly skilled art, is done from old drawings after much research. •

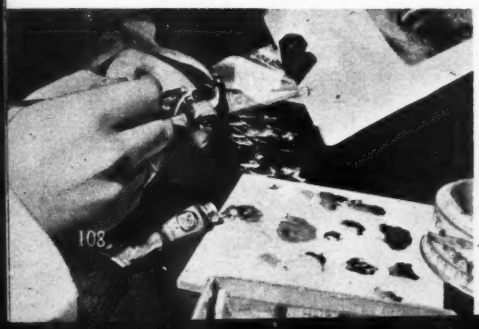


Here a French soldier is carefully checked for its authenticity before being painted.

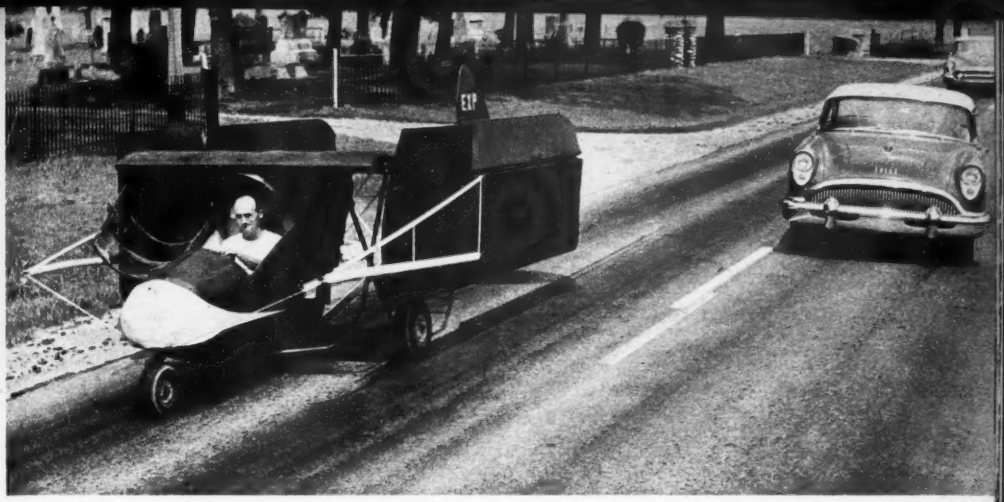


Bittard at work modelling one of his miniature masterpieces from solid lead block.

Painting is painstaking job for final value often depends much on how well it's done.



Search ends as elderly connoisseur reaches for piece he needs to complete his army.



Dewey Bryan and his auto-plane have a somewhat shattering effect on other drivers.

THE CAR THAT FLIES

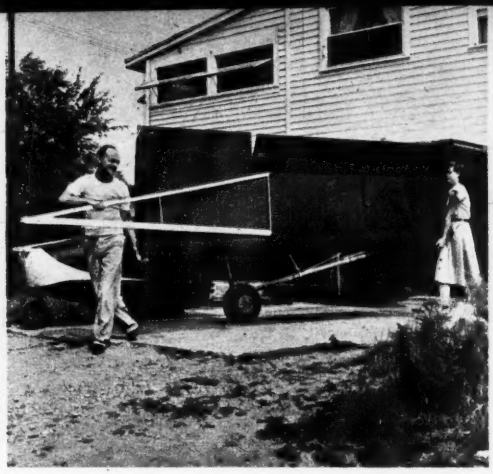
Here's a perfect solution to traffic jams: Drive to the nearest airport and take off.

DEWEY BRYAN and his auto-plane contraption are equally at home on the highway or in the air. When the Highland, Mich., inventor becomes annoyed with Sunday drivers he simply pulls into the nearest airport, rigs his wings and takes off into the wild blue yonder, just as easy as you please.

The 33-year-old General Motors Proving Ground test driver didn't literally sprout his wings and fly. His converti-plane was the payoff of a ten-year dream, three and a half years of building and about $250 in cash.

When the strange looking contraption is airborne, it is capable of about 60 mph.

Dewey's 600-pound experimental model inspires more awe than it does confidence.



"Car's" wings are lifted from side brackets and attached to the body for flight.

Classifying flying mixture was headache but Dewey has auto and pilot's license.

Converti-plane's 40-hp Continental engine, tail section were taken from sports plane.

Dewey began his unique craft with the motor and wings from a crashed plane. He assembled the mechanism in his basement and was laughed at when he putt-putted his flying machine into the Pontiac Airport. But a half hour later, when he was in the air, airport employees were scratching their heads in wonderment.

To go from driving to flying, the wings of the craft must be lifted out of their side brackets and attached to the body of the plane. This takes about 30 minutes. The machine flies at about 60 mph and lands at 25 to 30.

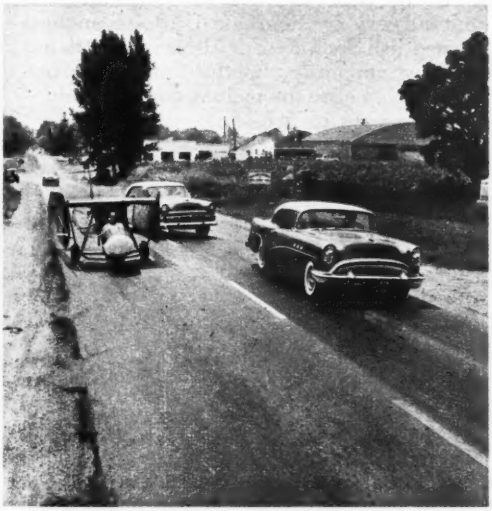
On the road, the wings are neatly tucked back alongside the "car" and have a somewhat shattering effect on fellow motorists. As one of Dewey's neighbors says, "I'm afraid to follow Dewey too close for fear of what the other drivers will do after seeing him."

Photos by Curt Gunther

Changeover requires about half an hour. Here Dewey and his wife secure the wings.

Craft is pusher type with propeller behind wings, like Wright Brothers' Kitty Hawk.

Weird looking contraption usually gets the once over when Dewey putts along highway.



Dewey gases up. Vehicle will do about 45 mph on highway, gets 28 miles to a gallon.

State officials were puzzled at first as to how they should classify the contraption. Was it a car or a plane? Finally Dewey got auto plates for highway travel and another license for flying operations.

In flight the Bryan plane has the look of an early Wright or Bleriot flying machine because of its uncovered fuselage. Like the first Wright plane it is a pusher —has its prop aft of the wings.

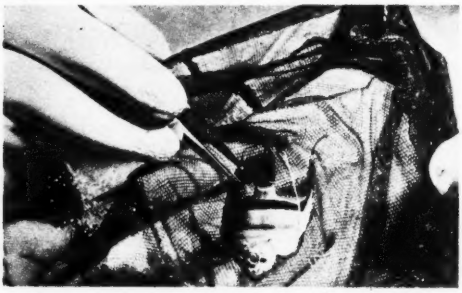
Roadable airplanes have been designed and flown before but Dewey believes his single seater is the first to carry its wings down the highway. Others must leave them at the airport or haul them in a trailer, which is cheating slightly, Dewey feels.

"What I'm trying to build," Dewey says, "is a plane that will make flying practical and economical for everyone." •

Fish Doctor

Very small doses of whisky are sometimes given to pep up fish.

FISH fanciers the world over send their ailing pets to London for treatment and surgery by Reginald Dutta, economist turned fish doctor. For 20 years Dutta has been administering to the finny tribe and he can even cure the baffling common cold—as it appears in fish. •

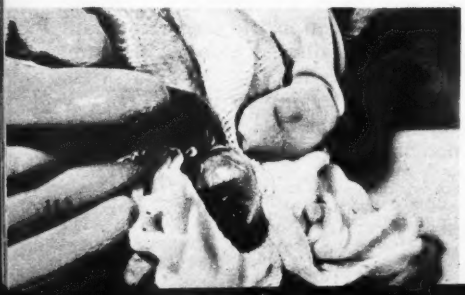


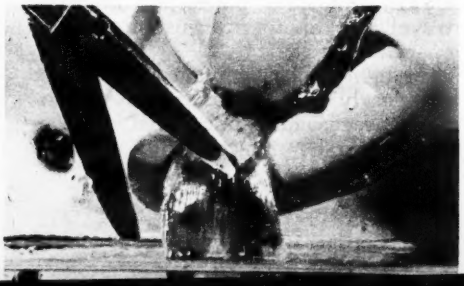
Dutta examines fish out of water for several minutes without doing them any harm.

"White spot" caused by sudden chill can be fatal if it is not treated immediately.

Gills, most sensitive organs of fish, are often attacked by disease, parasitic worms.

Bad environment causes tail rot which is stopped by cutting away the affected parts.





ELECTRONIC FOOD ANALYZER checks ripeness of fruit, vegetables, eliminates bad selections. R. Reece, S. Pasadena, Calif.

METAL SPIKES on rubber tires which would slip over lawnmower's wheels, aerate lawn while mowing. Michael Fey, New York, N. Y.

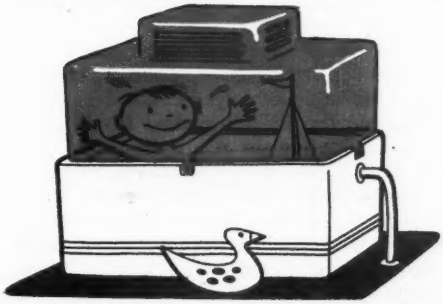
INVENTIONS WANTED!

Is there a gadget you think should be invented? If so, send its description to Inventions Wanted Editor, MECHANIX ILLUSTRATED, 67 West 44 St., N.Y. 36, N.Y. Each one printed will be awarded $5.

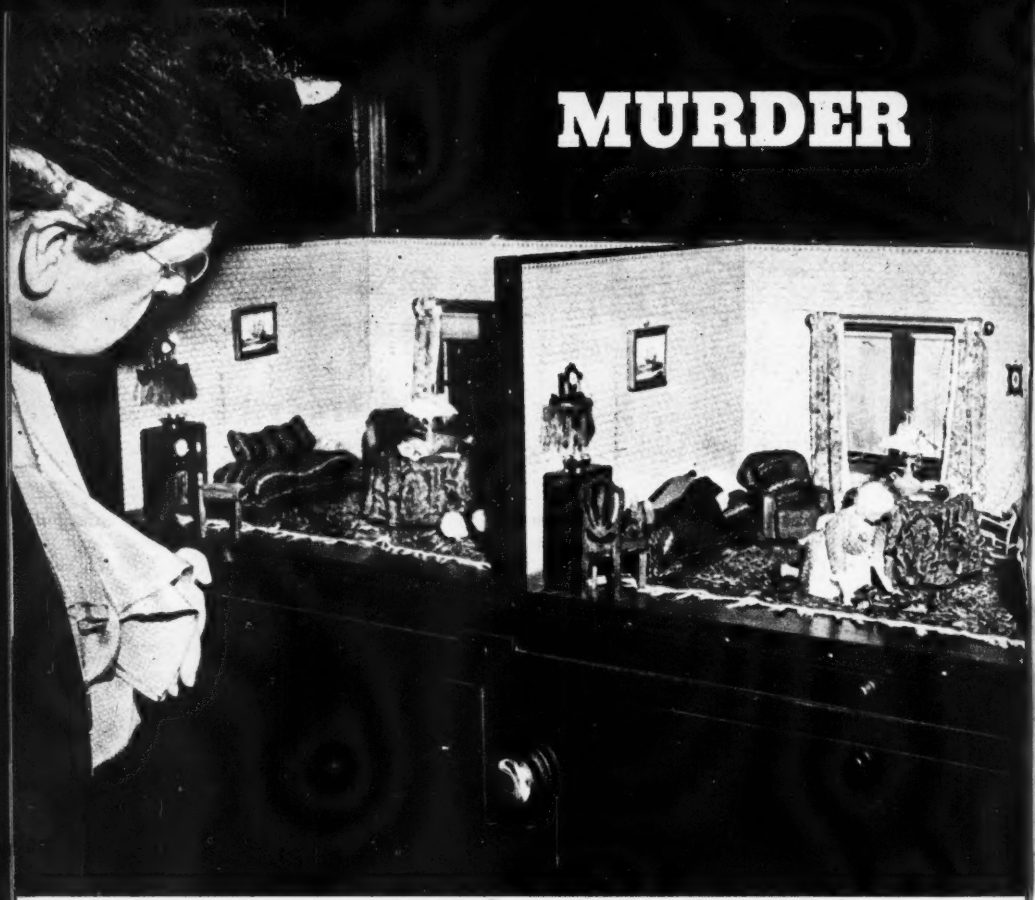
PAINT PILL which brush wielder would merely drop into thinner to produce desired hues. Victor Ashford, Garden Grove, Calif.

PLASTIC COVERED bathtub for little monsters who like to splash. Prevents bathroom flooding. Jack Kruse, Unionville, Conn.

LUMINOUS SMOKE that sky writers could use to spell out night messages, produce eye-catching ads. F. H. Kraus, San Antonio, Tex.



MURDER



Double models show death scene before and after arrival of cops.

MRS. FRANCES LEE, who is a captain in the New Hampshire State Police and the only woman in the United States to hold such an active rank, has become, as a result of an unusual and non-paying hobby, a pioneer in the application of medical science to crime detection.

Her amazing series of model crime settings, which Mrs. Lee builds with the aid of a carpenter at her Littleton, N. H., estate, are housed in a special room at Harvard University's Department of Legal Medicine, which she founded and endowed and which is the first and only one of its kind in North America.

Resembling shadow boxes, the models are built into the walls and are illuminated under glass in the darkened room. Above each model is furnished such general information as the "investigator" would probably obtain before determining the nature of death.

The "investigators" who attend Harvard's seminars in homicide are medical examiners, pathologists, coroners, city and town police officers, and state police. Mrs. Lee's models serve to instruct them in the niceties of observation.

Mrs. Lee takes anywhere from three to four months to complete each model. The crimes selected for the groups are based on true cases, though various aspects are cleverly disguised so as to prevent the well-informed investigator from guessing the solution.

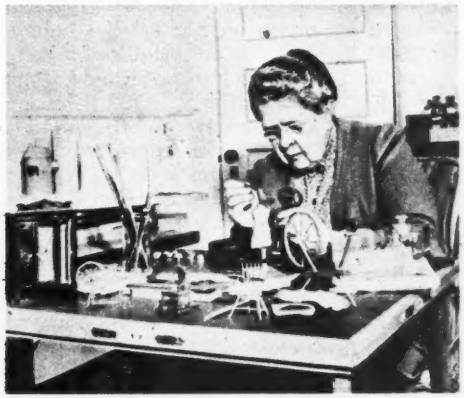
Mrs. Lee's crime nutshells, say veteran officers who have viewed them, really take the place of actual experience. She goes to unbelievable lengths to achieve effects. She builds barns, houses, every kind of setting—and fur-

IS HER HOBBY

A gentle 77-year-old dowager is New England's top criminologist and the creator of Harvard's famous "nutshell studies" of unexplained death.

By John N. Makris

Mrs. Lee works on the furniture for "nutshell study." Tiny spinning wheel spins.



The socialite and Dr. Alan Moritz inspect charts of varying types of bullet wounds.

nishes them with lifelike, third-dimension realism. She uses special lights and special magnifying lenses on her glasses while working on the models, handling dental and watchmaker's tools like an expert.

Mrs. Lee even has to scale down her needle and thread and the size of her stitches when fashioning sweaters, lace work on dresses, chair backs, doilies, bedding, or when knitting the stockings worn by the female figures in her models. The knitting needles she uses, each smaller than a common pin, are the tiny ones used by Belgian women in lacemaking.

Perhaps the most amazing thing about her models is that the doors actually open, bureau drawers open, window shades roll up, stove lids lift, books open and have printed pages, and costumes are complete even to underwear. In one of the miniature settings is a state trooper who is only five inches tall. The whistle hanging around his neck can be blown. The pencil in his hand is made from the point of a toothpick but, incredibly, it has lead in it.

A door, no larger than a postage stamp, shows a bullet hole in the screen. Like everything else in Mrs. Lee's amazing models, the bullet hole is exactly in scale. On the floor in a model kitchen is a miniature red wooden mousetrap. It works.

Mrs. Lee wants no distracting "phonyness" in her details.

"Nutshell studies," explains Mrs. Lee, "are not presented as crimes to be solved. They are, rather, designed as exercises in observation and evaluating indirect evidence, especially that which

may have medical importance. Through ignorance, in many cases, important evidence has been destroyed."

To emphasize such ignorance in detection, one of Mrs. Lee's models shows two rooms that are apparently identical. One of the rooms shows how it was 80 minutes after a police officer has entered it. The cop has committed more than 30 major errors, plus a score of minor ones.

Each nutshell crime model is also a distinctive period setting. There is a country living room of the present day with miniatures of the New York Times and the Littleton Courier on the floor by a vacant armchair pulled up before a fireplace. The mastheads of the newspapers are perfectly reproduced. A tiny ashtray on a table no larger in circumference than the eraser of a pencil is filled with diminutive cigarette butts.

One of her models depicts a barn hanging. The lumber used to build this barn came from a 200-year-old barn on her Littleton estate that had been blown down during a bad storm. She had her carpenter slice the wood paper-thin, take off the inside and the outside, throw away the middle and put them together again, sandwich fashion, to retain their authenticity.

The farm tools displayed in this model, no longer than a common pin, are perfectly fashioned. The saw is razor-sharp and will draw blood if handled improperly. The ox yoke in the barn is a soft, weathered blue that comes only with time and exposure to the elements. Carrying out her lifelike effects further in this particular model, Mrs. Lee covered the ceiling of the barn with actual cobwebs and dust and saw to it that the corpse hanging from the beam really turned.

The wallpaper in many of her models is perfectly reproduced and it often takes a whole roll to paper one of her miniature rooms. A divan has real springs and a mattress.

Mrs. Lee's father was John Jacob Glessner, a vice-president and director of the International Harvester Company. This, and other affluent connections, should explain how Mrs. Lee can spend so much on her special hobby. Quite early in life she acquired a taste for things in miniature, began making models of such groups as the Chicago Symphony Orchestra and the famous Flonzaly quartet. Her interest in legal medicine and crime detection developed through her friendship with Dr. George Burgess Magrath, a Harvard classmate of her brother who came to be New England's foremost medical examiner. Since approaching President Lowell of Harvard many years ago about starting the University's department of legal medicine Mrs. Lee has given the department nearly half a million dollars besides uncountable time and devotion to her tiny tableaux of unexplained death that sharpen the observation power of serious students of crime. •

Mrs. Lee and model of a human figure in one of the scenes. Scale is inch to foot.

This tableau of Death In The Kitchen is remarkable for stove and sink that work.

Crawling reptiles don't give Frank Earnest the creeps. He breeds 'em on his unique farm.

By Jack Kemmerer

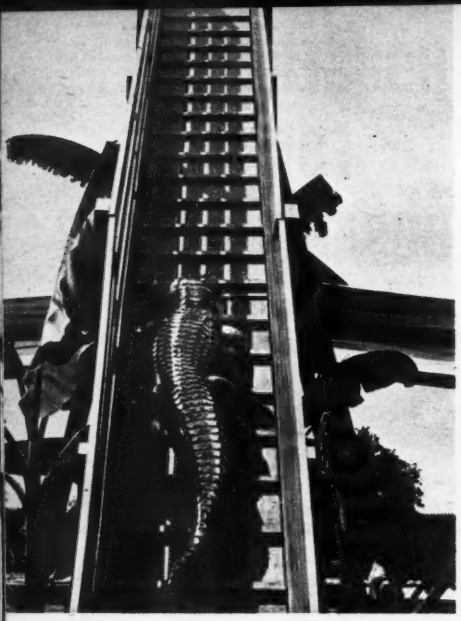
HOUSEKEEPER FOR A THOUSAND 'GATORS

One thousand slithering alligators such as these are the "crop" on this unusual reptile farm.

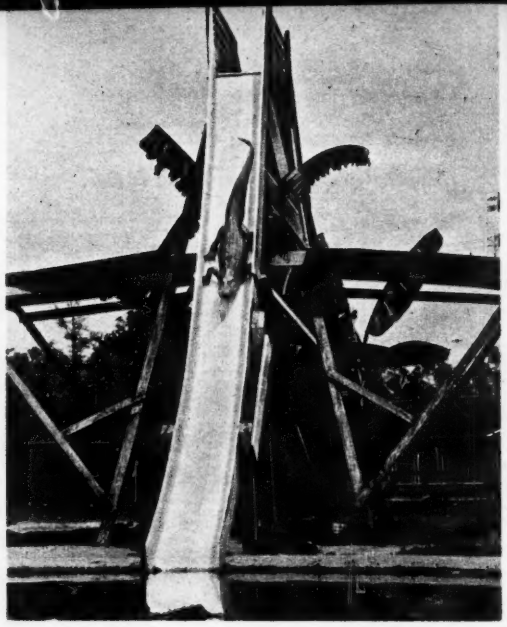
THERE isn't an artillery range within a 100 miles of Frank Earnest's alligator farm in Buena Park, Calif., and yet on a summer afternoon you'd swear that a half-dozen "Big Berthas" were firing on the range. "A thousand alligators, cracking their big jaws, can make a lot of noise," Earnest says.

Counting the eight-inch baby snappers, Earnest possibly does own that many alligators. In any event he is one of the few men who has made a success of raising them commercially, and he owns the only alligator farm in the west.

He developed his present "crop" of young alligators, ranging in size from the little snappers to the seven-to-11-foot 'gators, 45 to 50 years old from



Trundling slowly up ladder-like walk, this hefty fellow is out for a bit of sport.



Wheeee, down he goes on his white belly into water. 'Gators like to frolic on slide.

giant, wild American alligators captured in the southern part of the United States.

Earnest keeps his amphibious crawlers in a group of artificial ponds and pools that consist of large shallow concrete tanks with sufficient open ground around for the alligators to crawl out and take their daily sunbaths.

"One reason for segregating the 'gators according to size," Earnest says, "is to display them better to the public." Actually, that is not the main reason. Alligators are extremely cannibalistic and will eat anything that moves, especially a smaller alligator.

"The farm was originally founded in 1905 to raise alligators for their leather," Earnest recalls. "That soon proved to be highly unprofitable, however, and we shifted over to become an educational feature and display our alligators to the public."

A commercial size alligator, averaging from three to five feet in length, brings about $3.00 on the open market. But Earnest has to raise the 'gator from a baby and it requires from 10 to 20 years for an alligator to reach this commercial size. Add the cost of food and upkeep of the farm and it is easy to see why alligator farming has proved so disappointing to the majority of people attempting it.

The California Alligator Farm is unique among such farms because here alligators are actually raised from the egg on. The large majority of 'gator farms do not raise the reptiles at all but capture them from wild life and display them to the public.

In less informed circles, the very mention of alligators conjures up visions of a dreadful beast which waits impatiently for human beings to devour. Despite this formidable reputation, they will usually shy away from man. If cornered, however, the reptile is a dangerous antagonist.

The alligator uses his mighty tail to wreck havoc on anyone who dares approach. The whole body bends like a bow, since the thick neck does not turn, and is then snapped back with crashing impact.

Tex, one of the farm's employees since its founding in 1905, remembers well the damage an alligator can do with his tail. Many years ago Tex was back in northwestern Louisiana on a hunting expedition for the farm. They had heard rumors that a big, old "granddaddy"

Well, here's a healthy specimen displaying his 'gatorly chest. Watch that tail, Bub.

Imagine having this heavyweight put an arm lock—up to your shoulder—on you.

'gator, at least 13 feet in length, had been seen prowling around.

One of the hunters aroused a nine-foot 'gator that lay in the brush. He made a quick, lucky shot and knocked the reptile over. The hunter, a 200-pound man, approached the 'gator that he thought was dead. With one blow of its tail the alligator broke his leg, threw him more than 10 feet, and knocked him unconscious.

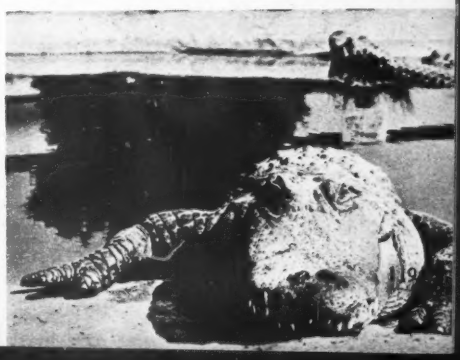
The hunters captured the old alligator they were seeking the following day and he is now on display at the farm. Named Killer Blue, he is a 13-foot, 800-pound behemoth, and the third largest alligator in captivity in the world. Alligators live to ripe old ages, if they escape the hunters, and Killer Blue has been estimated to be more than four centuries old.

As an educational feature the California Alligator Farm has been very successful. Each year more than 100,000 visitors make the trip through the farm to see the reptiles.

One of the largest costs is providing the 1,500 to 2,000 pounds of horsemeat consumed each week by the alligators in the hot summer months. "I get one break that the ordinary stock farmers can't count on," Earnest said. "Alligators hibernate during the winter and only eat about five or six months out of the year."

Speaking of eating reminded Earnest of a southern delicacy that not many people have a chance to taste. It's 'gator-tail steak. Running down the length of the long tail, around the spinal column, is a thick cylindrical column of muscle. When an alligator is killed for his leather, hunters frequently cut out a section of muscle, slice it into suitable thicknesses, and broil it over a swamp-wood fire. "It makes first class eating," Earnest said, "at least the hunters said so. I wouldn't try it." •

Pooped out, our sliding pond pal reveals overlapping teeth as he snoozes in the sun.

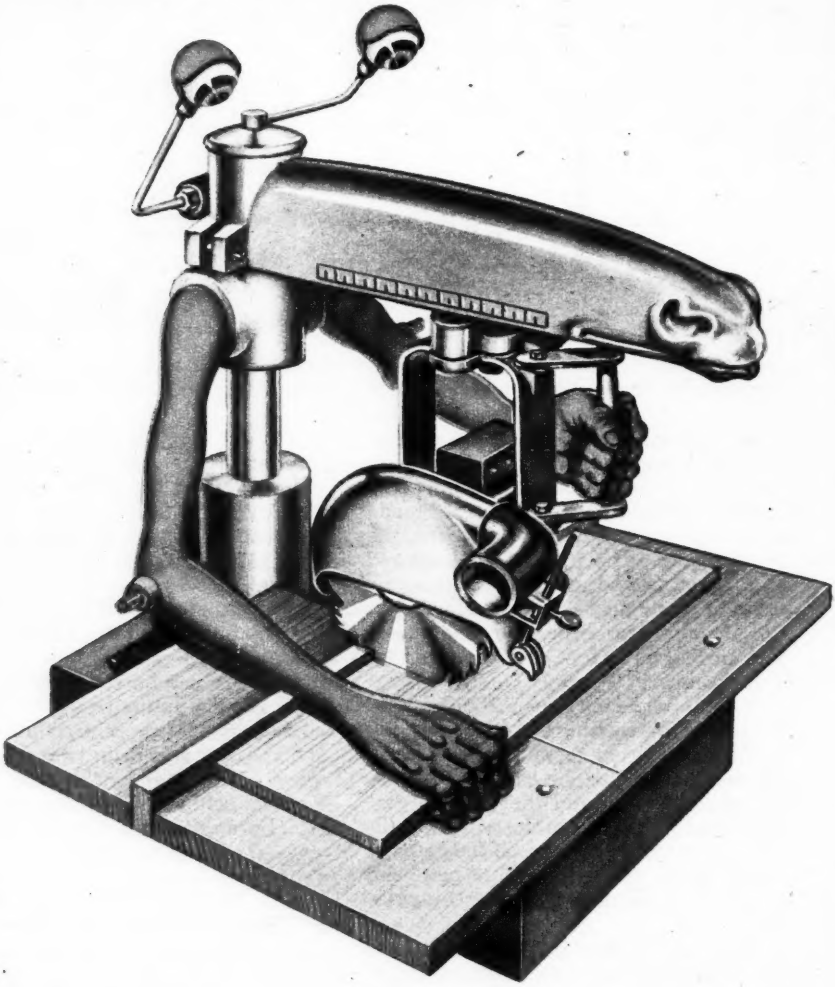


SPECIAL SERVICE SECTION

THE RADIAL ARM SAW

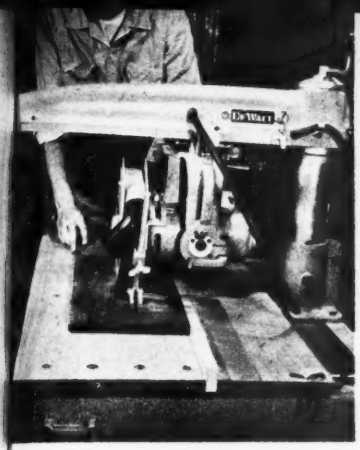
This is the fourth of MI's series of articles on power tools and how to get the most out of them.

By Jerry Parker

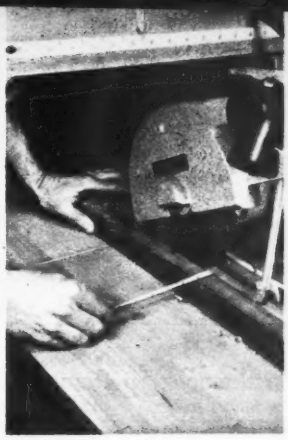


THE radial arm saw is creating revolutions in home workshops all over the land. Craftsmen and hobbyists are discovering that they can get professional scope and skill into their work with this multi-purpose machine. They are finding out something builders and manufacturers have known for years: for utility and safety you can't beat a radial arm saw.

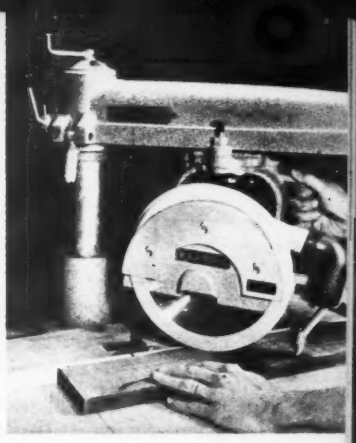
The fellow who owns a radial arm saw finds it will do just about everything except come when he whistles. It is a most versatile saw—a complete workshop. It



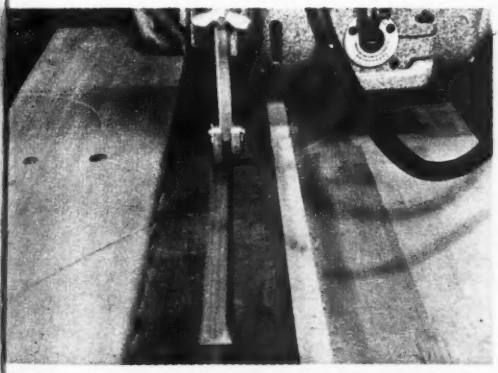
Ripping may be done from either side of bench. Rip scale will insure great accuracy.



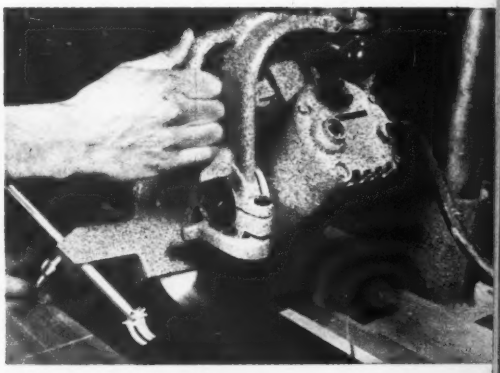
Ploughing is easy dado chore. The topside cutting feature makes dado work much safer.



For right or left-hand miters, set arm at angle. The guard has a rubber sawdust chute.

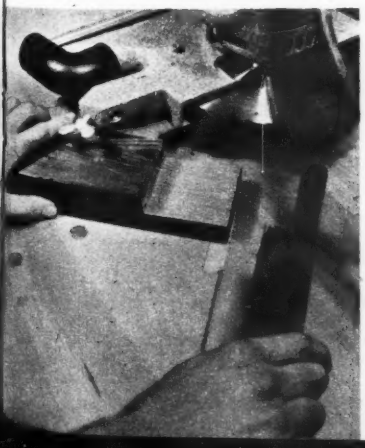


For center ploughing, the crank is used to lower the arm and dado head into the work.

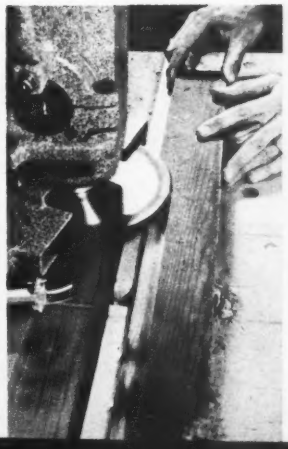


Compound miters, difficult with ordinary saws, become easy with the radial arm saw.

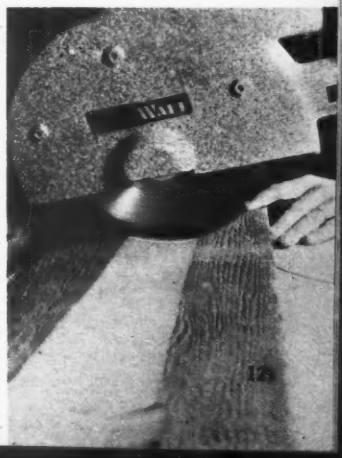
For lap joints, first cut goes through center of stock. Finish with successive higher cuts.

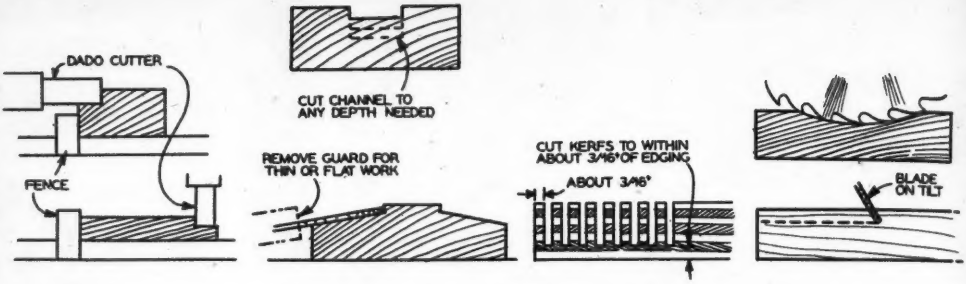


Rabbet cut is done with motor standing on head. Bevel rabbets are made same way.



Contour cutting is done by tilting and swiveling motor. Saw kerf creates the shape.



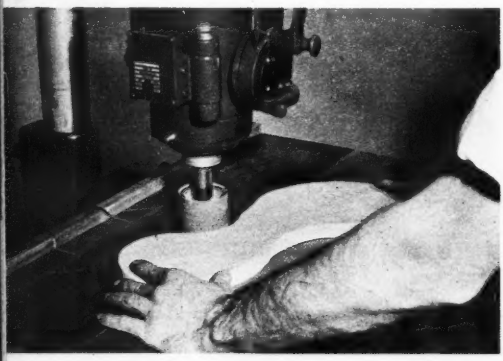


will saw, dado, and shape. With attachments added it will function as a lathe, jig or saber saw, router, grinder, buffer, planer, sander (belt, drum and disk) jointer and drill press.

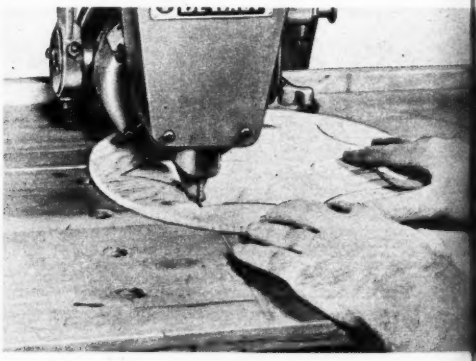
Radial arm saws are prized in the construction field and in industry, where models up to 10 hp, and with blades, believe it or not, up to 44 inches are used.

The radial arm saw consists of an arm (sometimes called a ram) cantilevered from a column at the back of the saw table. Beneath the arm, and riding freely on it, is a yoke which holds the motor. The saw blade and other attachments are bolted directly to the motor shaft. The motor-blade unit is pulled through the work by hand in most operations. It's an effortless pull, for everything glides on ball bearings.

Only one model, the Shopmaster Universal, does not employ the principle of

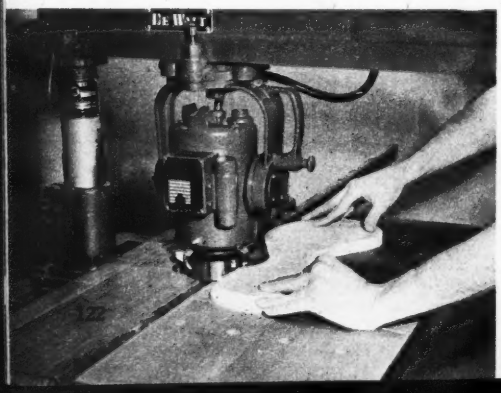


Small drum sanders fit onto motor shaft. Various grades of sandpaper are available.

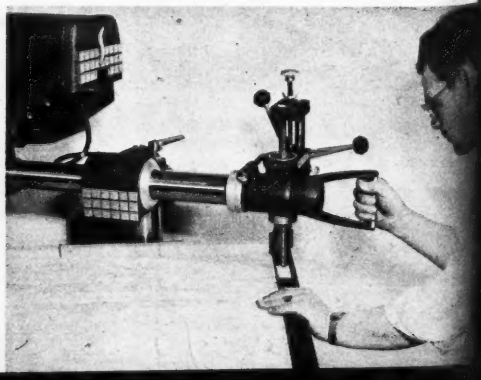


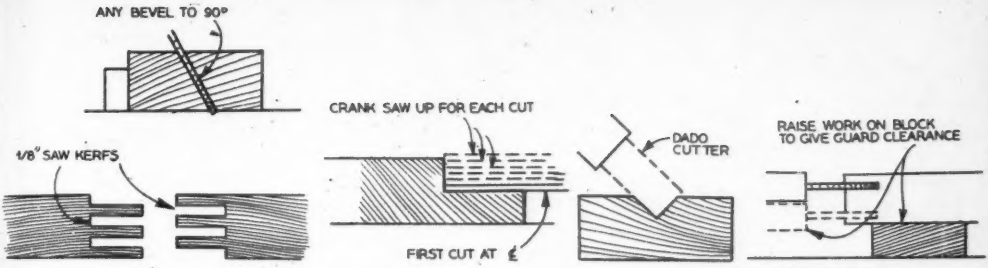
Saber saw attachment will cut 2-inch stock, do exterior curves and blind scroll work.

Tilting arbor shaper gives 50% more shapes per cutter. Fence is shown pushed aside.



The drill press attachment of this saw can be used for boring, routing and mortising.

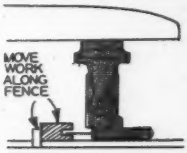


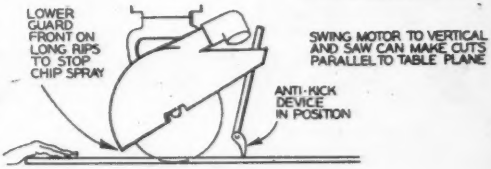


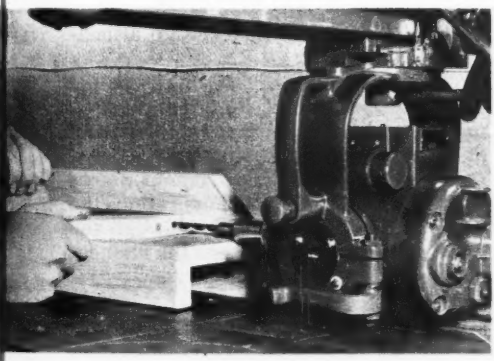
direct drive. The Shopmaster has a motor mounted at the rear and power is transmitted with pulleys and V belt.

Radial arm saws for the home workshop come in 8, 9, and 10-inch sizes. Prices start at around $230, go up to $400. There are floor models, portables, and models you can build into a bench. Each saw comes with a blade, wrenches for attaching the blade and other accessories. Efficient safety guards are

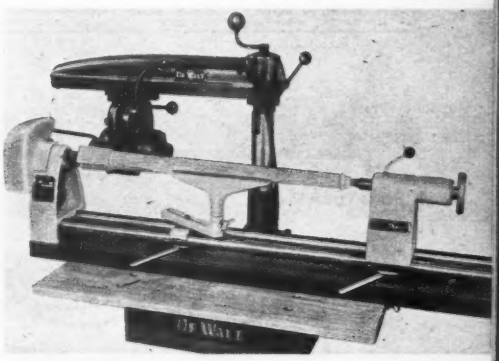
Drawings show some of the various cuts possible with the blade in vertical position.





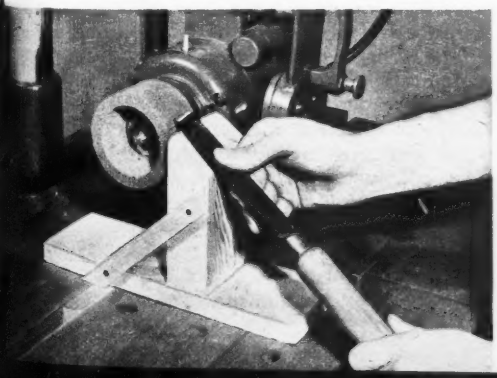


This saw uses an adaptor for shaft into which bits are locked. Jig lifts up work.

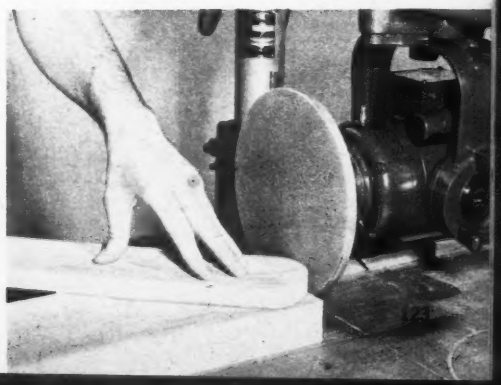


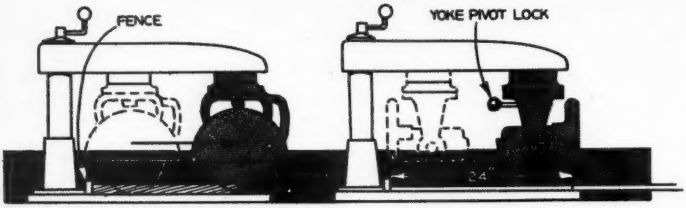
Lathe will swing stock up to 12-in. in diameter, and up to 37-in. between centers.

You can grind your tools, do buffing, polishing and wire wheel work with the saw.



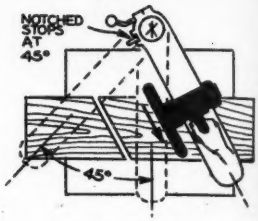
Disk sander fastens on motor like saw blade, makes any sanding operation possible.



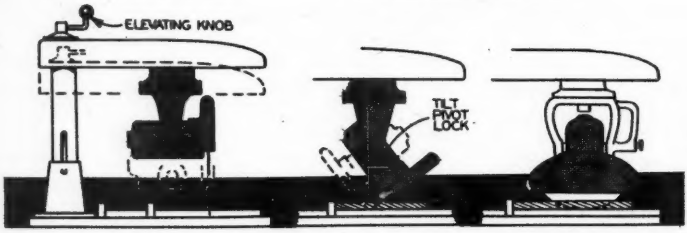


MOTOR AND BLADE CAN BE PULLED ACROSS WORK FOR CROSS CUTS UP TO 18" WIDE

SAW TURNED 90° AND LOCKED FOR ALL LONG RIPS - WILL RIP PANELS 24" FROM FENCE TO CUT LINE



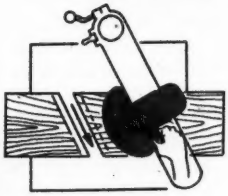
ALL MITER CUTS ARE MADE BY SWINGING THE OVERHEAD ARM TO DESIRED DEGREE



REGULATING DEPTH OF CUT BY RAISING OR LOWERING COLUMN AT REAR BY TURNING KNOB

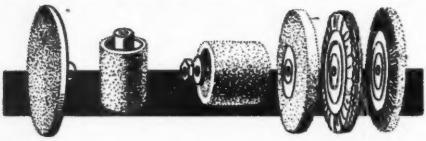
SAW WILL TILT TO ANY ANGLE FOR BEVEL RIPPING

OR BEVEL CROSS CUT BY PULLING TILTED BLADE ACROSS WORK

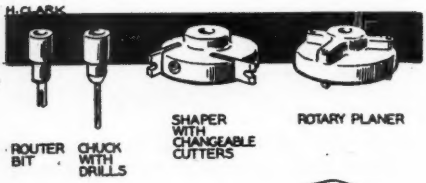


COMPOUND MITER CUTS MADE SAME WAY, EXCEPT THAT SAW BLADE IS TILTED

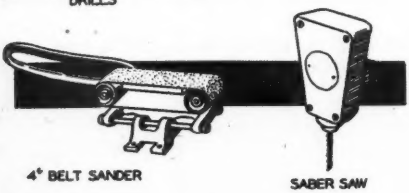
A FEW OF THE ATTACHMENTS WHICH WILL FIT THE MANDREL OF THE RADIAL ARM SAW TO OPERATE VERTICAL OR HORIZONTAL



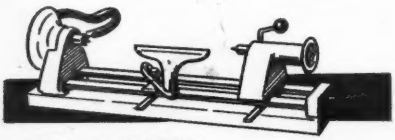
DISK OR DRUM SANDER — DRUM GRINDER — DISK GRINDER — BUFFER — WIRE WHEEL



ROUTER BIT — CHUCK WITH DRILLS — SHAPER WITH CHANGEABLE CUTTERS — ROTARY PLANER



4" BELT SANDER — SABER SAW



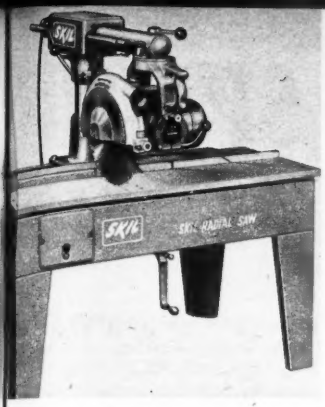
WOOD LATHE FOR TURNING

provided for saw blades and attachments.

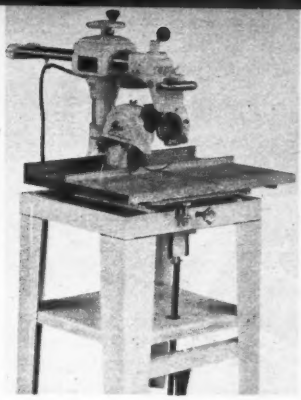
The outstanding virtue of the radial arm saw is the fact that the blade is mounted above the work table, instead of below it. You can always see what you are doing and follow layout marks without trouble. For most operations the hand guides the saw blade through the work; this definitely lessens the chances of having the blade snap at you.

Another asset of the radial arm saw is the way your work always lies flat on the table, up against the fence. It's easier to handle your woodwork this way and you can manage much bigger pieces—in fact, pieces of unlimited length if there's an open door or window near your saw. One radial arm saw manufacturer estimates that his model uses 80 per cent less working area than an ordinary table saw.

The radial arm saw is simplicity itself to operate. There are two basic cutting procedures and all other operations are offshoots of these elementary maneuvers. For crosscutting, dadoing and the like, you just pull the blade across the work. For ripping, rabbeting and similar chores, the motor and blade are locked at a right angle [*Continued on page* 200]

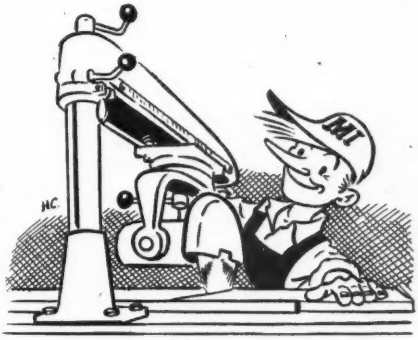


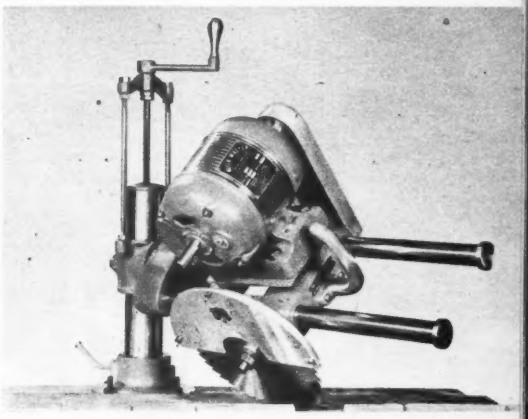
Skill Corp., Chicago, makes this saw in 2 and 7½ hp models, 14 to 18-in. blades. Arm glides on steel bearings. $525.



Comet Cub by Consolidated Machinery & Supply of Los Angeles, has 8-in. blade, ¾ hp motor, AC-DC; $267.75.

Delta Home Workshop 18-in. saw is $239 without stand. Motor is ½ hp, table top 20 x 22. Saw also takes 9-in blade.



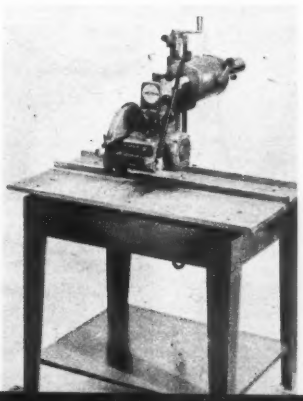


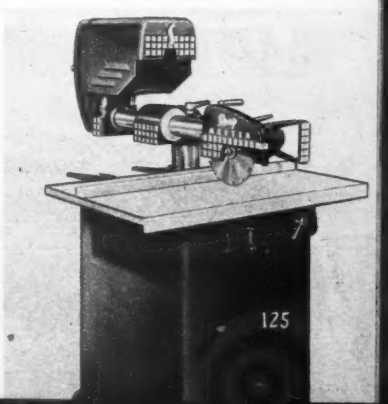
Mitermaster, by Hendrick Mfg. Co., Marblehead, Mass., $84 without motor; with ¾ hp motor, $135; 8 or 10-in. blade.

Home Mate, by De Walt, Lancaster, Pa., 9-in. saw with ½ hp motor, $229; with ¾ hp $260. The stand is optional.

Craftsman, by Sears, Roebuck. $340 for the 1 hp model, $395 for 2 hp. Saw has 15x42 table, quick-setting stops.

Universal Power Tool by Shopmaster, Minneapolis, 8-in. saw, $234. Sander, drill, lathe attachments available.





OLD SPAIN

Picturesque and very practical—this neat boy-size seat will stand many years of use.

By Harold Jackson

YOUTH'S CHAIR

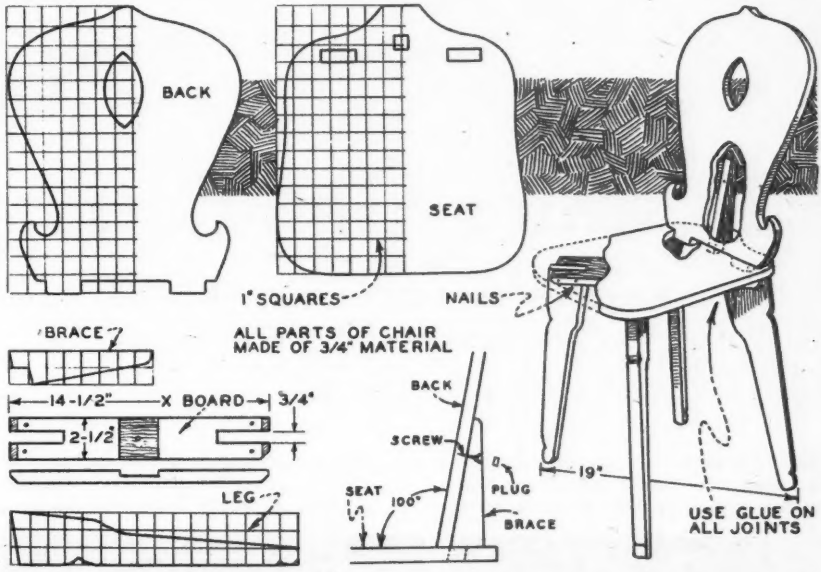
THIS reproduction of an old Spanish chair is very simple to make and will stand a lot of rugged use. The slightly revised design shown here is ⅔ size and is intended for in-between youngsters who need a chair of reduced size.

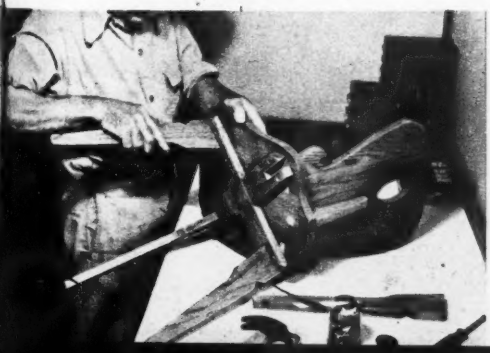
There are just nine parts to this chair, all made of ¾-in. solid oak or other hardwood. Oak built up to the required width using glue and dowels was used for the chair shown.

Paper patterns for the seat, back, legs and brace should be made from the drawing below. The design is traced on the boards and the parts are cut out with a narrow blade saw. Care must be used in cutting the parts. A lot of edge grain shows on the chair which must be carefully rasped and sanded smooth.

The back is joined to the seat by a double mortise and tenon joint and is braced by a block fitted as shown in the sketch. One screw is used in brace block. Head of this screw is sunk and plugged as indicated.

The "X" boards are attached to the underside of the [*Continued on page* 210]

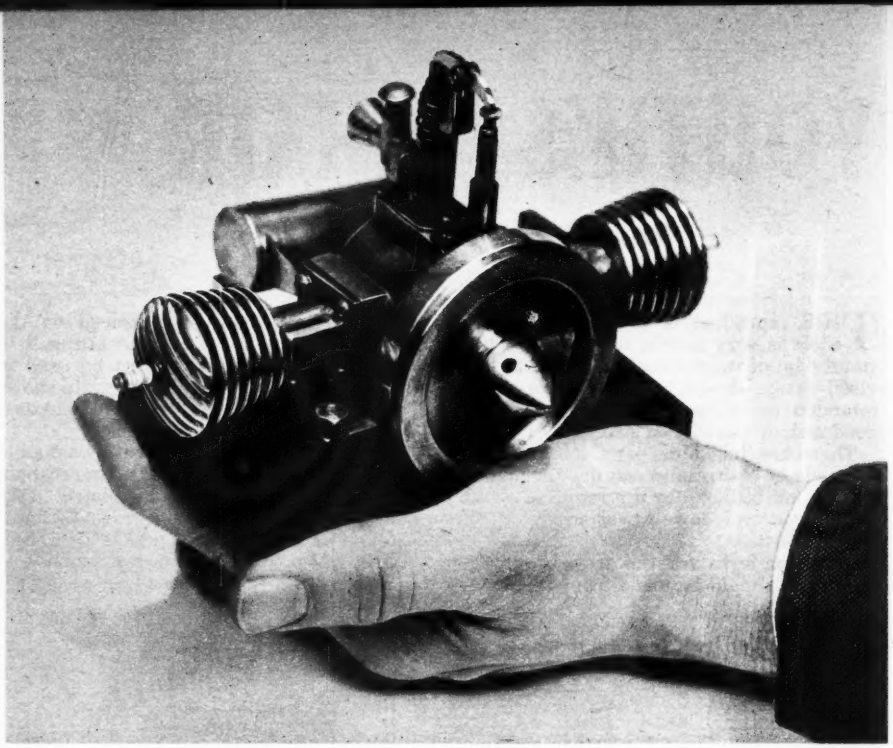




All parts, far left, ready for assembly. "X" boards are shown being glued and screwed to bottom of the seat. Cut notches carefully.

Middle photo, left, shows back board being attached to seat with double mortise and tenon joint. Brace is similarly attached.

Legs must fit the slots tightly. Use glue and key nails at this point. Liquid hide glue is recommended for assembling this chair.

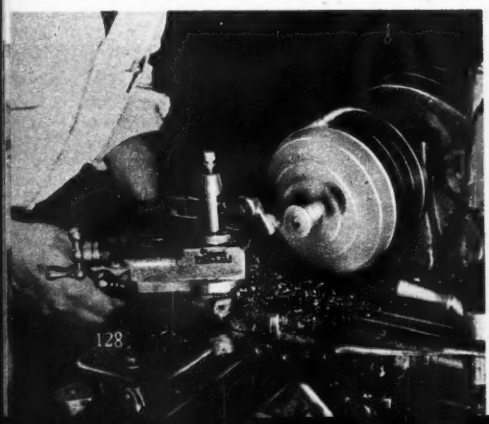


Miniature Gas Engine

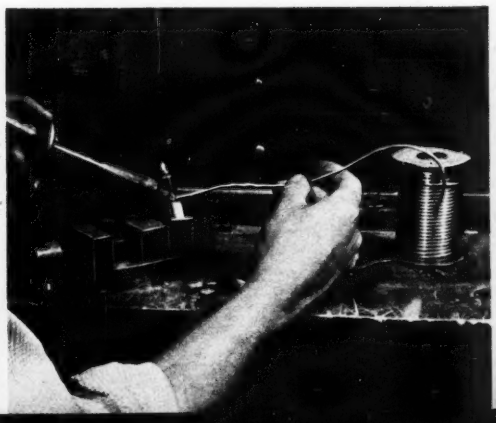
MI's smooth-running miniature twin will develop one-quarter horsepower at a speed of 5,500 rpm.

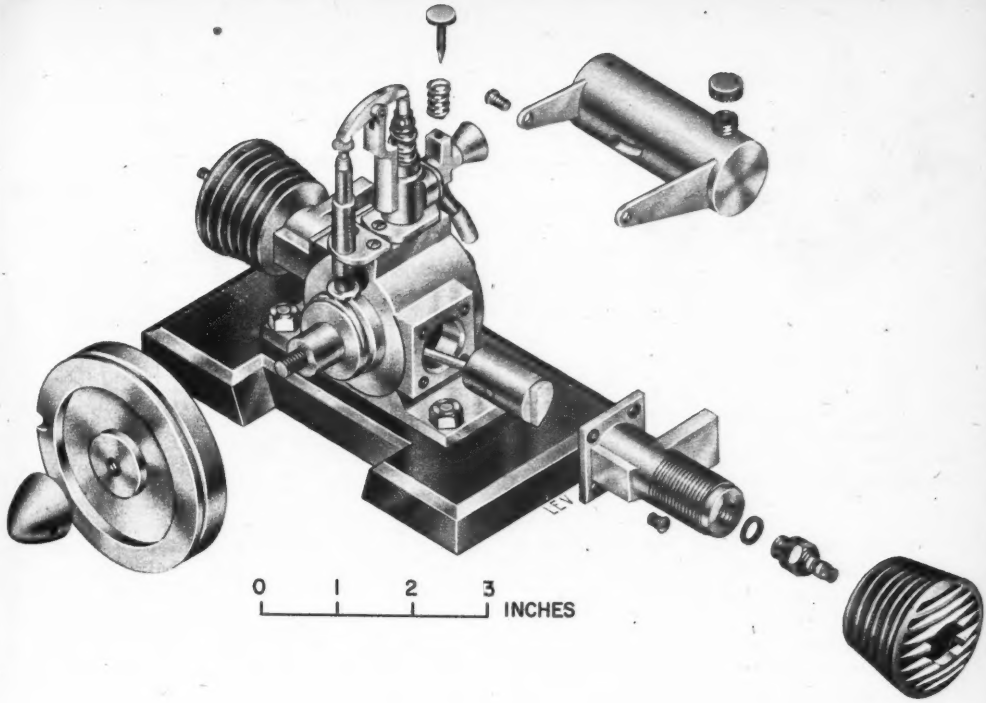
By Alfonso Vassallo

The use of a lathe is absolutely necessary in the construction of the twin. Photo below shows the turning of the brass cooling fin.



The by-pass cover is soldered over the exhaust port on the cast iron cylinder. Each cylinder is made from one single piece.



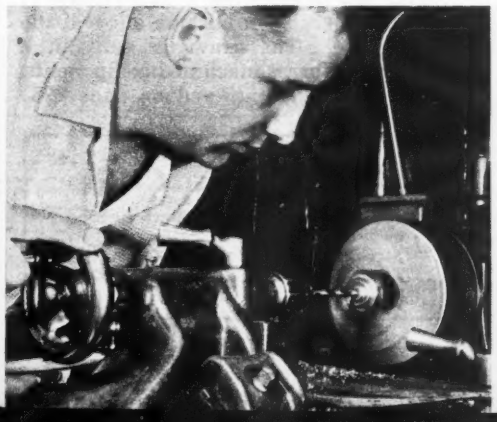


IF you have been looking for a power plant to move your favorite cabin cruiser model, the above miniature twin is the answer to your problem. Designed mainly as a prime mover, weight was not held to a minimum—the completed engine weighs two pounds. The materials employed are everyday metals that will do the job and do it well.

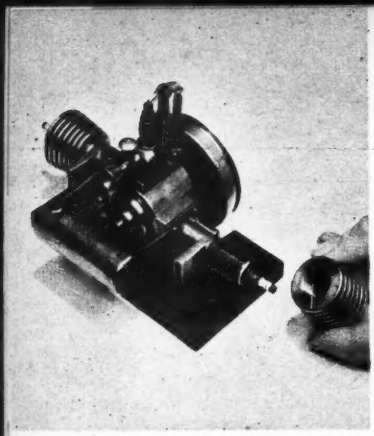
The twin has a .50 bore and .750 stroke, with a displacement of approximately .38 cu. inches. A pair of Champion V-3 Glo plugs are used for cylinder ignition. The crankshaft floats on a pair of ball bearings mounted in the crank case at both extremes; this arrangement reduces surface friction considerably.

A novel fuel valve is employed, operating from a cam throw on the rear of

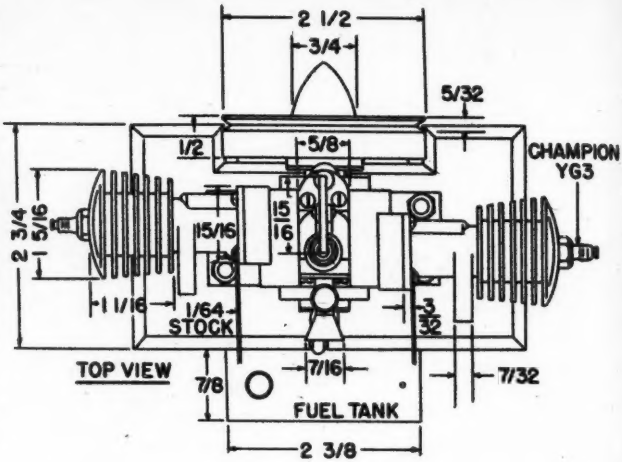
Substituting aluminum for certain brass parts will simplify machining. Very careful attention should be given to all fits.



To start, hook up batteries in the manner shown below. A lanyard wrapped in the fly wheel groove should provide easy starting.



The cooling fin unscrews easily to give access to Glo plug. Note how arm of fuel tank attaches to one of the cylinder screws.

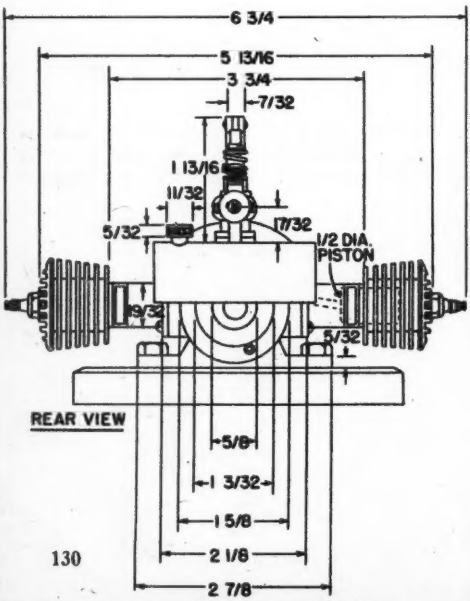


the fly wheel. While the engine is in operation the valve lifter face sits just off the center of the cam permitting the lifter to rotate and wear evenly during its operation.

Prior to starting an ambitious project of this nature a number of power tools are an absolute must. A few basic items are: a lathe for all turning and lapping; a drill press for drilling, tapping, reaming and various lapping operations; a bench grinder will be required for tool bit and drill sharpening. Along with this, a number of machinist tools, such as a 1- and 2-inch micrometer, 6-inch rule, various taps and drills and a vernier caliper are also required.

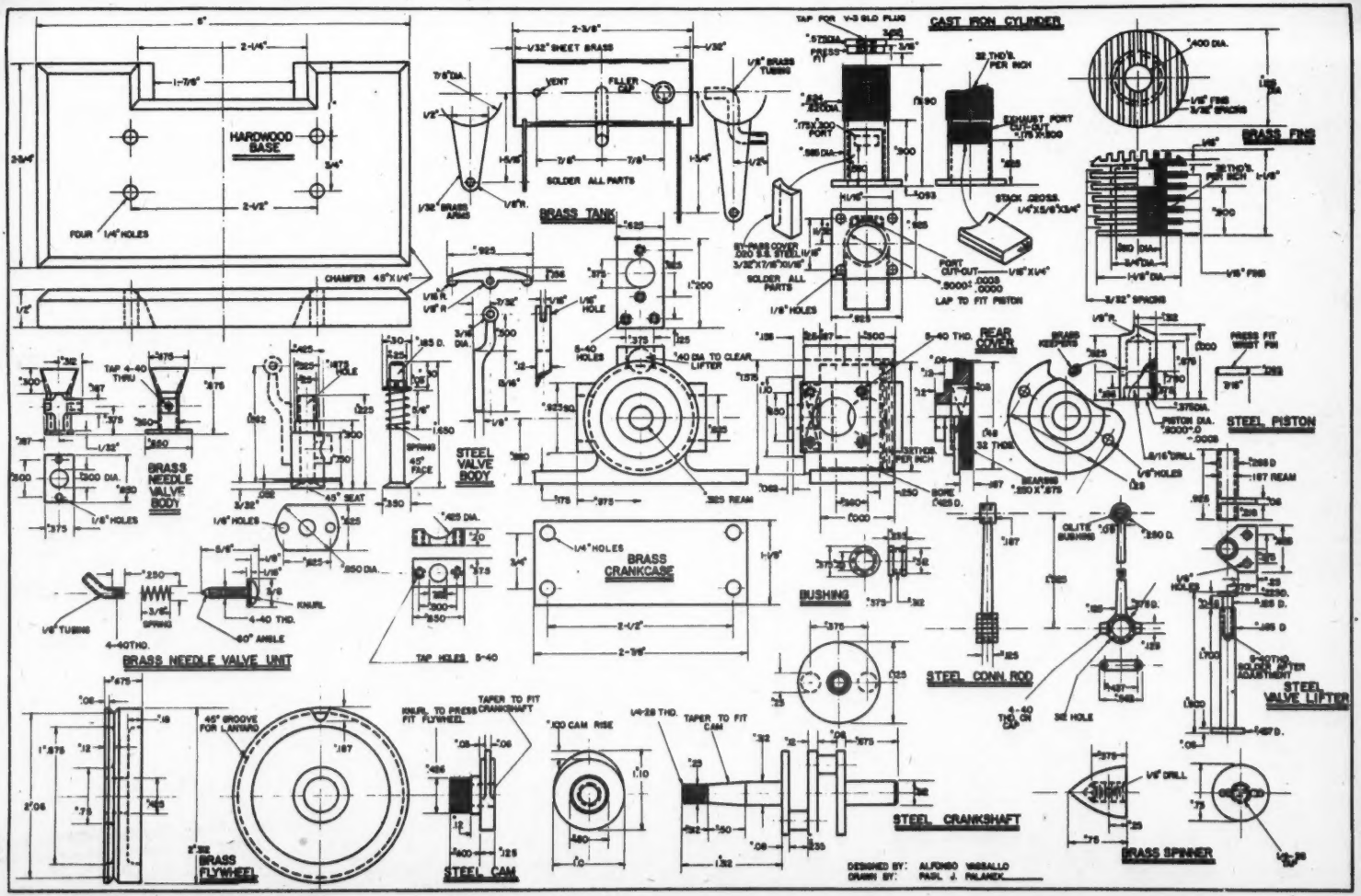
As is customary with any project of this nature, a complete and thorough understanding of all details are most important for a proper end result. Careful attention should be given to all fits, the lapped fits of piston to cylinder, and wrist pin tolerance. All drawing dimensions are given in fractional or decimal dimensions, but don't let this throw you. Most all the important fits and tolerances are in the engine and not visible, therefore set up your own tolerances for all surface dimensions, or follow closely the ones given.

Proceed with the most basic of parts until you come to the machining of the more complex details. The crankshaft, connecting rod, wrist pins and pistons can be considered simple and requiring little skill. All the above mentioned parts are made from a good grade of steel, preferably a chrome alloy of the 4130 type. The drawings call out a number of brass machined components, such as the [*Continued on page* 198]



TWICE ACTUAL-SIZE PLANS

will greatly simplify construction. Send 50 cents to Mechanix Illustrated Plans Service, Fawcett Building, Greenwich, Conn. Specify Gas Engine, Plan M-235.


HARDWOOD BASE
FOUR 1/4" HOLES
CHAMFER 45° X 1/4"
BRASS TANK
SOLDER ALL PARTS
VENT
FILLER CAP
1/32" SHEET BRASS
1/8" BRASS TUBING
1/32" BRASS ARMS
CAST IRON CYLINDER
TAP FOR V-3 SLO PLUG
PRESS FIT
32 THD'S. PER INCH
EXHAUST PORT CUT-OUT
STACK .020 S.S. 1/4" X 5/8" X 3/4"
BY-PASS COVER .020 S.S. STEEL 1/16" 3/32" X 7/16" X 1/16"
PORT CUT-OUT
LAP TO FIT PISTON
1/8" HOLES
BRASS FINS
1/16" FINS
3/32" SPACING
BRASS NEEDLE VALVE BODY
TAP 4-40 THRU
1/8" HOLES
STEEL VALVE BODY
SPRING
45° FACE
45° SEAT
5-40 HOLES
.40 DIA TO CLEAR LIFTER
.325 REAM
REAR COVER
5-40 THD.
BRASS KEEPERS
PRESS FIT WRIST PIN
STEEL PISTON
PISTON DIA.
8/16" DRILL
1/8" HOLES
BEARING
BORE
BRASS CRANKCASE
1/4" HOLES
BUSHING
OILITE BUSHING
STEEL CONN. ROD
4-40 THD. ON CAP
3/32 HOLE
STEEL VALVE LIFTER
SOLDER AFTER ADJUSTMENT
BRASS NEEDLE VALVE UNIT
1/8" TUBING
SPRING
4-40 THD.
60° ANGLE
KNURL
TAP HOLES 5-40
45° GROOVE FOR LANYARD
BRASS FLYWHEEL
KNURL TO PRESS FIT FLYWHEEL
TAPER TO FIT CRANKSHAFT
STEEL CAM
.100 CAM RISE
1/4-28 THD.
TAPER TO FIT CAM
STEEL CRANKSHAFT
1/8" DRILL
BRASS SPINNER
DESIGNED BY: ALFONSO VASSALLO
DRAWN BY: PAUL J. PALANEK

WASHTUB BASS

The coolest cats dig the solid beat of this crazy, mixed-up tub.

By Ron Anderson

Right: A trio has a bit of fun. Take the stance shown and lean on stick.

A BASS violin is something you're not likely to have around the house. Yet the beat of such an instrument adds rhythm to any musical get-together. Here's one to make that will produce deep, boomy tones comparing favorably with the real thing.

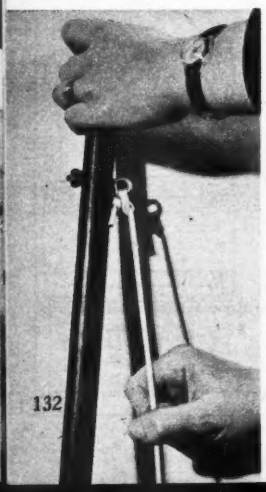
Install an eyebolt at the bottom center of a galvanized tub. Cut two 8-in. legs from electrical conduit and bolt them in place so that they raise the edge of the tub about 3½ inches. Add rubber tips and tape on the edges of the tub to prevent scratches.

Cut a broomstick to about 46 inches in length, install an eyebolt about 5 inches from one end and notch the other end. Smooth the edges of the notch to prevent splitting when the stick is used on the bottom edge of the tub.

The string may be wire, twine or plastic-covered nylon clothesline. Tie it between the two eyebolts and you're in business.

Take the position shown in the lead picture and strum with a pick or by grasping the string between the thumb and the knuckle of the index finger. A change in tone occurs when the body is moved to change string tension. •

If the fingers are toughened up, here's best way to strum.



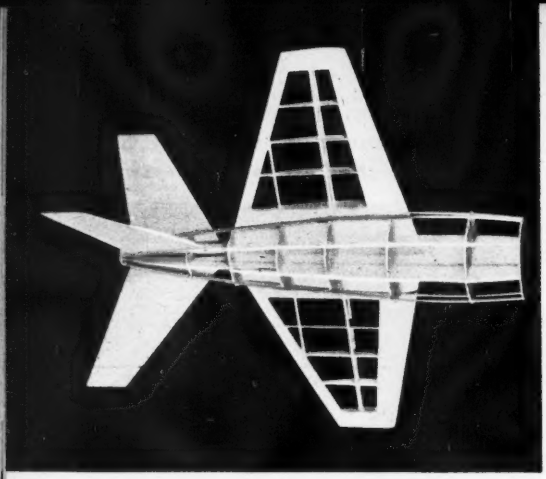
Notch in broomstick rests on lip at the bottom of the tub.

Strap bolted on side holds stick when it isn't in use.

VTO

Build a flying model of the most revolutionary of all aircraft—a plane that takes off vertically.

Turn page for story.



The wing and fuselage structure before the application of the Silk-Span covering.

The power plant consists of an .074 in. Cub engine. Two props are contra-rotating.

SOME ten years ago, the United States Navy initiated a development program for a vertical take-off type of plane. Two aircraft of this new species were built, one by the Convair (Consolidated Vultee) designated XFY-1. The other, built by Lockheed Aircraft is designated XFV-1. A model of the latter is the one we are going to build. These planes are not helicopters or convertiplanes. However, they have attributes of both in their flight patterns. It is said, that if you were to watch a take-off at maximum power the rising craft would disappear from view in less than a minute . . . that's power! Not only do they employ the maneuverability of a helicopter and the speed of a jet, they also carry aloft a variety of armament, from heavy machine guns to atomic weapons.

The secret of their phenomenal performance lies in their power plants. Both are powered with Allison Turboprop engines developing approximately 5,500 hp driving contra-rotating three-bladed props through a geared reduction box.

FULL-SCALE PLANS

will greatly simplify construction. Send 50 cents to Mechanix Illustrated Plans Service, Fawcett Building, Greenwich, Conn. Specify VTO, Plan No. M-236.

To quote Lockheed test pilot Herman R. (Fish) Salmon, "I've flown everything from helicopters to jets, but this is the most powerful plane I've ever handled."

Not only has the Navy revolutionized aviation but, they may force into play new measures in our Continental Air Defense Program. With these new designs any backyard is a military airstrip. The take-offs and landings are executed with such *finesse* one would think (if aboard) he were riding an elevator.

Our replica is a copy of the Lockheed version right down to the contra-rotating prop, since without it the model would never get airborne. This is the third such model built by the author with many of the bugs worked out. This design is something entirely different in model aviation. Bear in mind the design centers around two requirements. One, is to duplicate the prototype's vertical take-offs and the second, is to bring the craft down again in one piece to fly again. The model's design is for free flight all the way.

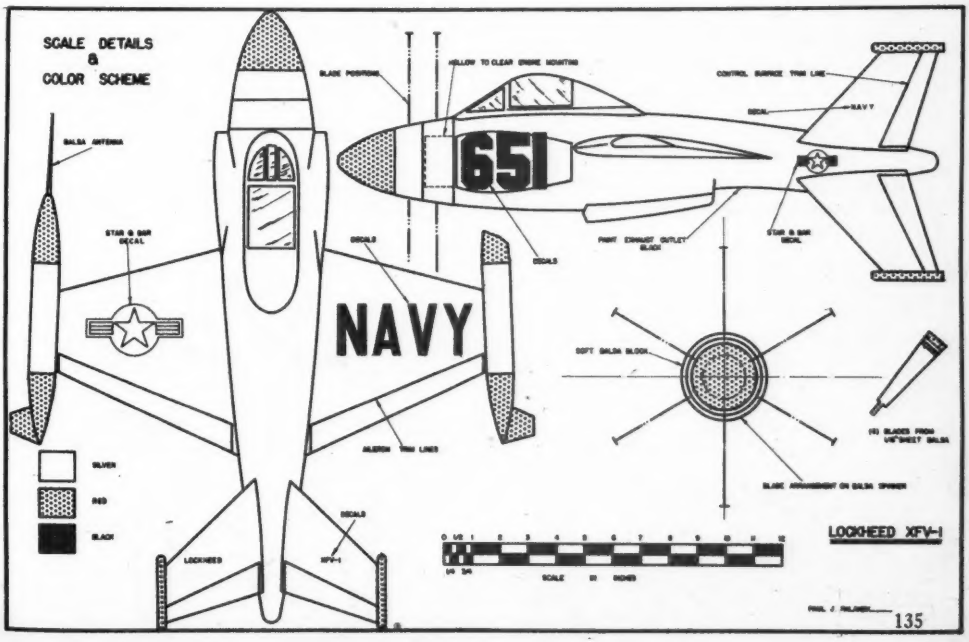
After careful study of the drawings, proceed by laying out the wing structure. For all spars, $\frac{1}{16}$x$\frac{1}{8}$ in. medium grade strips are employed. The ribs are shaped from $\frac{1}{16}$ in. stock, a good grade of sanded balsa is preferred. Bear in mind that a minimum amount of weight is most important. Use care and judgment in applying the glue to joints, use

Builder Paul Palanek starting the engine of the model for its initial test flight.

The model can be hand-launched as shown, or set in flight by cutting away tether.

it sparingly on the wing and fuselage framework.

Proceed by fastening the lower spars to a suitable work surface. Take note of the dihedral angle. Shape and notch the ribs as shown for the tapered effect and secure in place. Construct the wing, one half at a time, the limiting factor being the dihedral angle. Next fasten the ⅛ in. sq. leading edge and ⅛x½ in. pre-shaped trailing edge. Complete the structure by adding upper spars as shown. Allowing a sufficient time for drying, remove from the work table and sand smooth all joints on both upper and lower surfaces. Complete the wing panel by adding the 1/32 in. pre-sanded balsa skin covering. If necessary, moisten the curved areas to ease the wrapping of the skin over the wing leading edge. Smooth the applied covering using a fine grit sandpaper. *(turn page)*



Our next step is the basic fuselage assembly consisting of a simple crutch and former groupings. Throughout the fuselage construction use top quality presanded $\frac{1}{16}$ in. sheet balsa. The crutch of course is first assembled. Mark off on its surface pencil lines, to designate former positions. A wing cut-out is removed from the crutch in the area shown. Cement the wing panel into this opening. When dried, secure in place the shaped formers called for. In cementing these formers, try to keep them square to the surface of the crutch at all times. Allowing time for drying; work may now commence on the tail group.

Select top quality balsa, also $\frac{1}{16}$ in. sheet with 3 in. width. The four surfaces are made up of sandwiched layers of $\frac{1}{16}$ in. sheet balsa. This procedure gives the needed strength to the tail. When these surfaces are sufficiently dried, reduce them slightly in thickness, sanding to a streamline shape. Take note as to the method of mounting.

At this point the fuselage assembly should have thoroughly dried. Slit former G as shown in four places at a 45° angle. Insert the tail surfaces, cement securely in place and check for proper alignment. Stringers can now be added. Here again using top quality balsa, $\frac{1}{16}$x⅛ in. strips. Sand all formers as shown in their various cross sections. Add at this point the $\frac{1}{16}$ in. sheet exhaust pad to the aft fuselage area. Bring to a smooth surface all cemented joints. Prior to setting aside, install a 1x1½ in. dia. cut-out in formers A and B to receive the engine bearing block.

Engine arrangements and components are clearly shown; study them carefully. Brass, tubing and sheet is used in the dimensions given. Solder joints as shown only after the ¼ in. tubing telescopes into its mate and rotates freely. Complete the bearing half of the assembly and fasten to the balsa bearing block. The spindle half is next worked on. Assemble as with the bearing, making certain that the spindle rotates in its bearing *freely*. Solder to the forward spindle disk three mounting screws for the fastening of the Cub engine. When satisfied with the assembly and its operation, insert the engine into the fuselage.

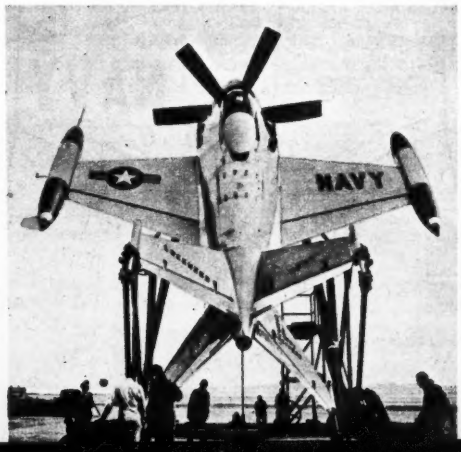
To top off the fuselage, fasten the tail block with the flight hook attached. This assembly is used for a tethered take-off. At this point in our program all surfaces are covered with Silk-Span including the sheet balsa areas. Wet the Silk-Span with water, dry, and apply two coats of clear dope.

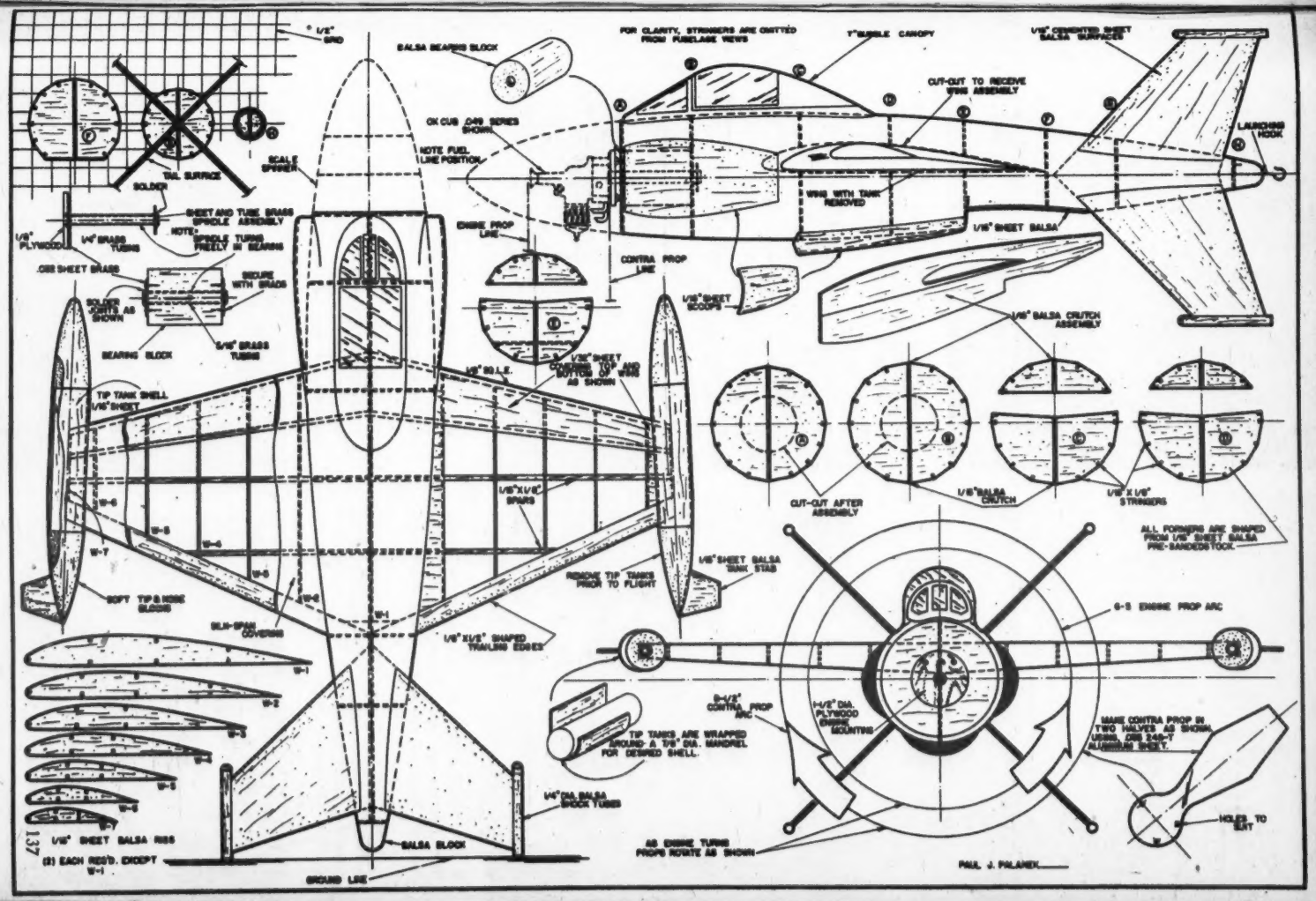
A standard 7¼ in. bubble canopy is fitted to the fuselage deck, distorted as shown to match the original. The three scoops are shaped using $\frac{1}{16}$ in. sheet balsa. Fasten them properly in place, apply tissue to conceal the grain areas. Bear in mind the model has two functions. One is for free flight, the other is to decorate a bookcase or table top.

The second plate carries all the required mark- [*Continued on page* 186]

Aloft! After fuel is cut off, model goes into horizontal flight path for landing.

The Lockheed XFV-1. Unlike our model, this ship uses its tail for landing.



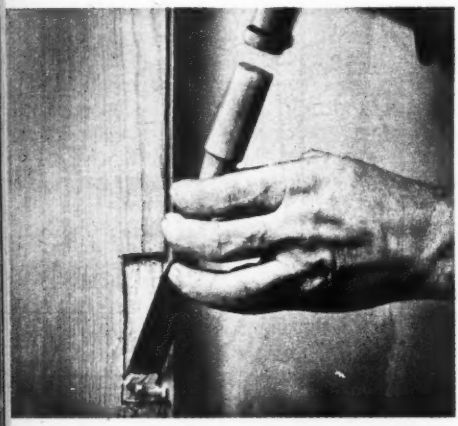


1/2" GRID
BALSA BEARING BLOCK
FOR CLARITY, STRINGERS ARE OMITTED FROM FUSELAGE VIEWS
7" BUBBLE CANOPY
1/16" CEMENTED SHEET BALSA SURFACES
CUT-OUT TO RECEIVE WING ASSEMBLY
LAUNCHING HOOK
OK CUB .049 SERIES SHOWN
NOTE FUEL LINE POSITION
SCALE SPINNER
TAIL SURFACE
SOLDER
SHEET AND TUBE BRASS SPINDLE ASSEMBLY
NOTE: SPINDLE TURNS FREELY IN BEARING
1/8" PLYWOOD
1/4" BRASS TUBING
.032 SHEET BRASS
SECURE WITH BRADS
SOLDER JOINTS AS SHOWN
BEARING BLOCK
5/16" BRASS TUBING
ENGINE PROP LINE
CONTRA PROP LINE
WING WITH TANK REMOVED
1/16" SHEET BALSA
1/16" SHEET SCOOPS
1/16" BALSA CRUTCH ASSEMBLY
1/32" SHEET COVERING TOP AND BOTTOM OF WING AS SHOWN
1/8" SQ.L.E.
TIP TANK SHELL 1/16" SHEET
1/16"X1/8" SPARS
CUT-OUT AFTER ASSEMBLY
1/16" BALSA CRUTCH
1/16" X 1/8" STRINGERS
ALL FORMERS ARE SHAPED FROM 1/16" SHEET BALSA PRE-SANDEDSTOCK
W-6
W-5
W-4
W-7
W-3
W-2
W-1
SOFT TIP & NOSE BLOCKS
SILK-SPAN COVERING
REMOVE TIP TANKS PRIOR TO FLIGHT
1/16" SHEET BALSA TANK STAB
1/8"X1/2" SHAPED TRAILING EDGES
6-5 ENGINE PROP ARC
9-1/2" CONTRA PROP ARC
1-1/2" DIA. PLYWOOD ENGINE MOUNTING
TIP TANKS ARE WRAPPED AROUND A 7/8" DIA. MANDREL FOR DESIRED SHELL.
MAKE CONTRA PROP IN TWO HALVES AS SHOWN, USING .025 24S-T ALUMINUM SHEET.
HOLES TO SUIT
1/4" DIA. BALSA SHOCK TUBES
1/16" SHEET BALSA RIBS
(2) EACH REQ'D. EXCEPT W-1
BALSA BLOCK
GROUND LINE
AS ENGINE TURNS PROPS ROTATE AS SHOWN
PAUL J. PALANEK

How to Hang a Door

LESS than $15, plus a little accuracy, can give you a new door. Only a few household tools are needed. Purchase an interior door of proper dimensions and 1½ in. thick. If a door the exact size of the opening isn't available, get a larger one and then follow steps shown in the pictures. •

1. Measure door length and cut enough off the bottom for clearance over rug. If rug is not used, leave about ½ in. clearance.



4. Use wood chisel to cut out wood inside lines drawn on jamb. Work with the grain, making depth equal to the hinge thickness.

5. Screw hinges to jamb and move door in place, blocking it up for correct clearance. Mark hinge positions on door edge.

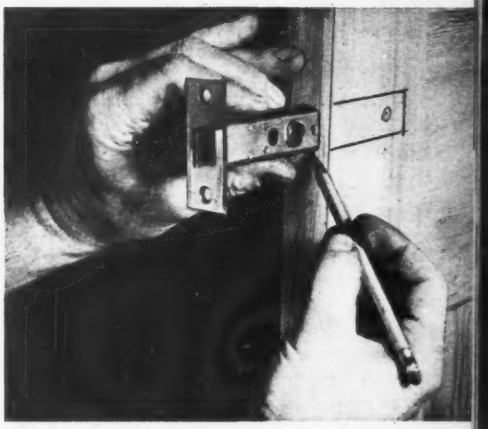
8. Use the exact size bit recommended and bore the holes accurately. Wedge the door so that movement won't throw the bit off.

9. Install cylinder and knobs with screws supplied. Bolt should work freely, can be turned for use on right or left-hand door.

2. Measure door width. If only a thin cut is needed, use a plane. Make fairly close cut — about ⅛-in. clearance each side.

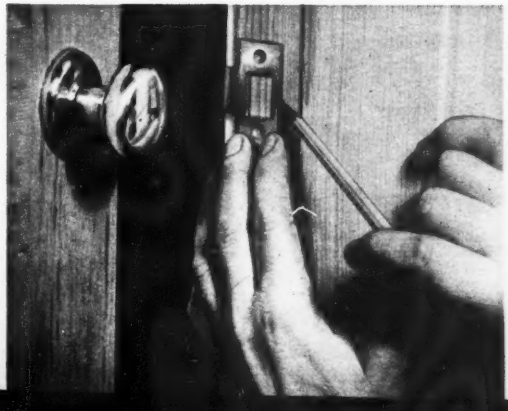
3. Loose-pin butt hinge (3½x3½) is taken apart, half placed 10 in. from floor (see that pin won't bind), outline is traced.

6. Paper template supplied with lock set is used for marking size and position of holes. Lock is about 34 in. above floor.

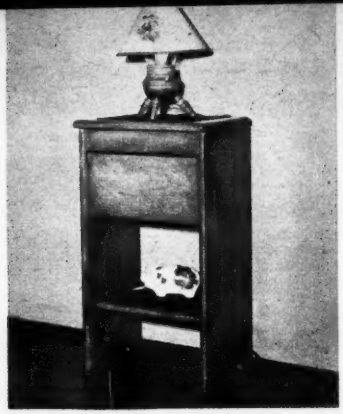


7. Place end of lock cylinder against the door edge, trace its outline. Place it on door side, check against template outline.

10. Close the door, locate catch on door. Trace outlines. Cut inner hole to a ½-in. depth, outer recess to thickness of catch.



11. Close the door, letting bolt slip into catch. Molding must be accurately fitted before securing with finishing nails.



This easily built night table was stained to match maple furniture.

Table would be more top heavy with a conventional drawer pulled out. Drop leaf makes contents more accessible.

NIGHT TABLE

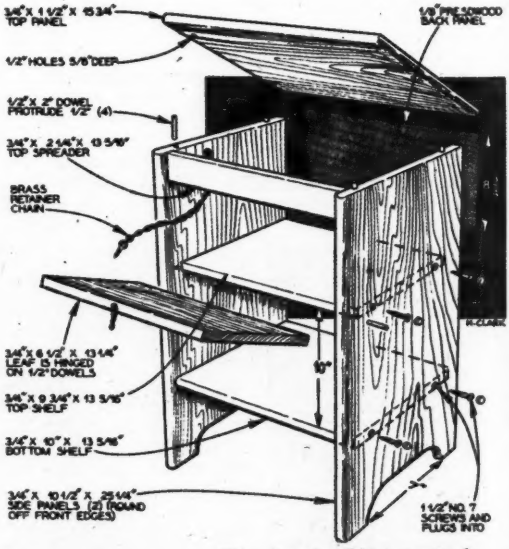
THIS night table was designed to fit in with maple furniture. If the actual wood is used, fine. Otherwise, inexpensive clear pine or poplar will do. When stained and finished, the difference is hardly noticeable.

A 10½-foot piece of ¾x12-in. stock is required. Cut the pieces to the dimensions indicated, make sure they're square and round the edges as required. Then sand all parts smooth.

Holes for screws and dowels in the different members must be lined up perfectly to insure a square, non-rocking piece of furniture. Best clamp the sides together, measure off distances carefully and use a ⅛-in. drill for pilot holes. A ⅜-in. drill is used to counterbore halfway through the stock for the dowel plugs.

In order to have an unbroken surface, the top is fastened from beneath with dowels and glue. Weight it down until the glue dries.

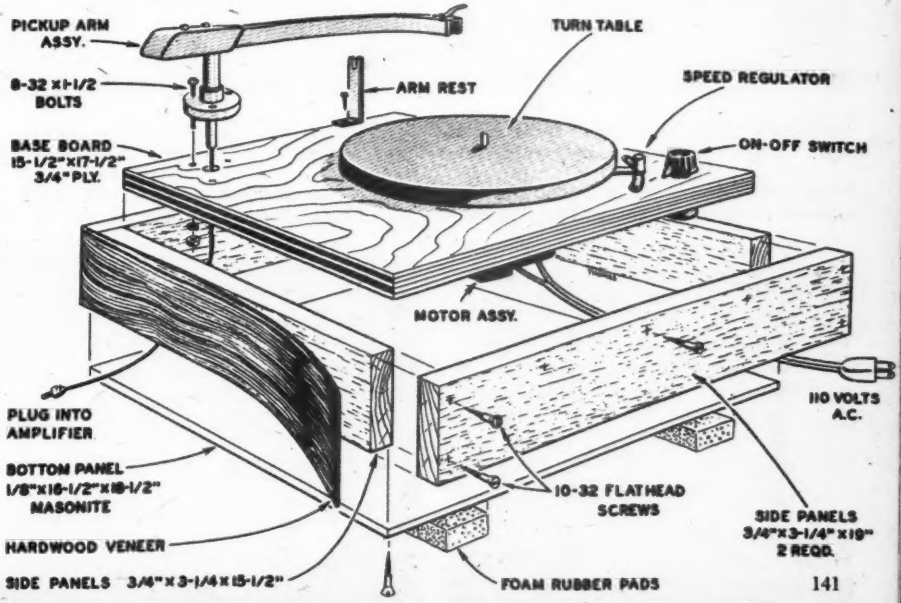
Use a wood filler on the completed piece for a more professional job. Stain and finish to match the bedroom furniture. •

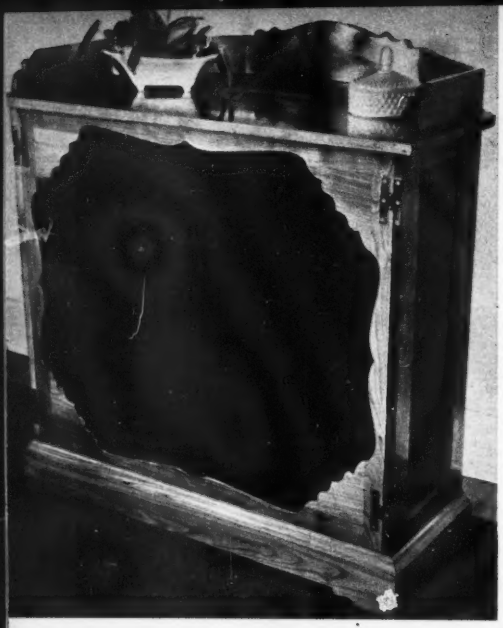


Record Player

By Sidney Norinsky

NOWADAYS the term "high fidelity" reminds us of ultra-linear amplifiers and complex speaker systems, but only too often the record player, the source of the sound, remains the weak link in the system. No super duper amplifier or speaker can correct the distortion, noise, wow or rumble that a poor pickup arm and turntable produces. A small, light plastic arm of the type usually found on cheaper automatic changers will resonate at one or more frequencies within the audio range, producing harsh, unpleasant booming and distortion at those points. In addition most [*Continued on page* 207]



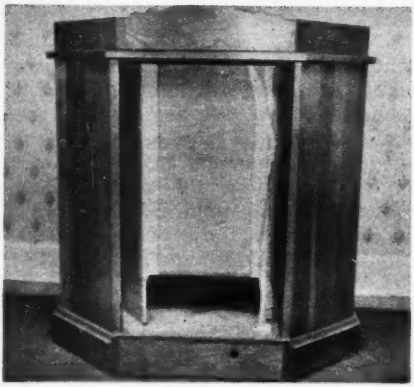


Period HI-FI Speaker

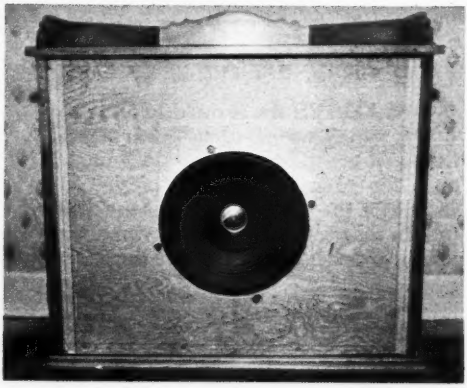
Period dress of the surroundings encloses a modern Hi-Fi speaker.

By H. F. Folk

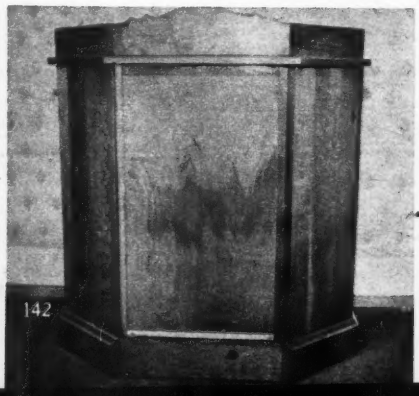
IF you have furnished your home in period style, this Hi-Fi speaker enclosure will fit right in. Electro Voice, Inc., Buchanan, Michigan, can furnish the plans on which the interior design of the enclosure is based. •



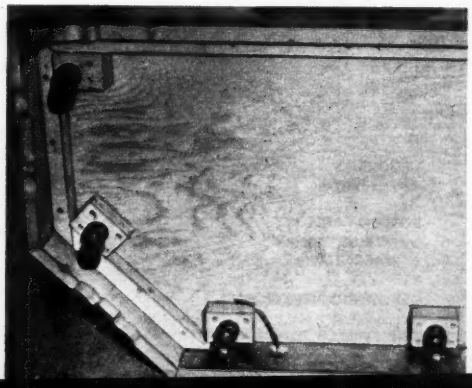
Inner back. Tape helps make enclosure airtight except for the slot at bottom front.



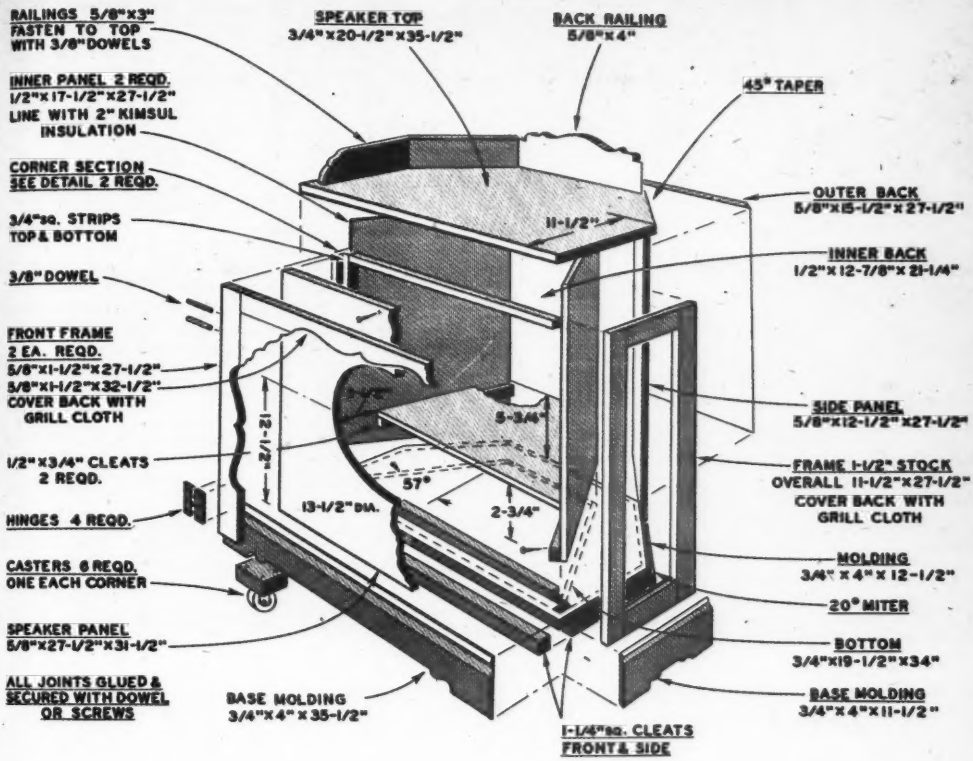
Outer back panel. Interior design of enclosure is based on Electro-Voice plans.

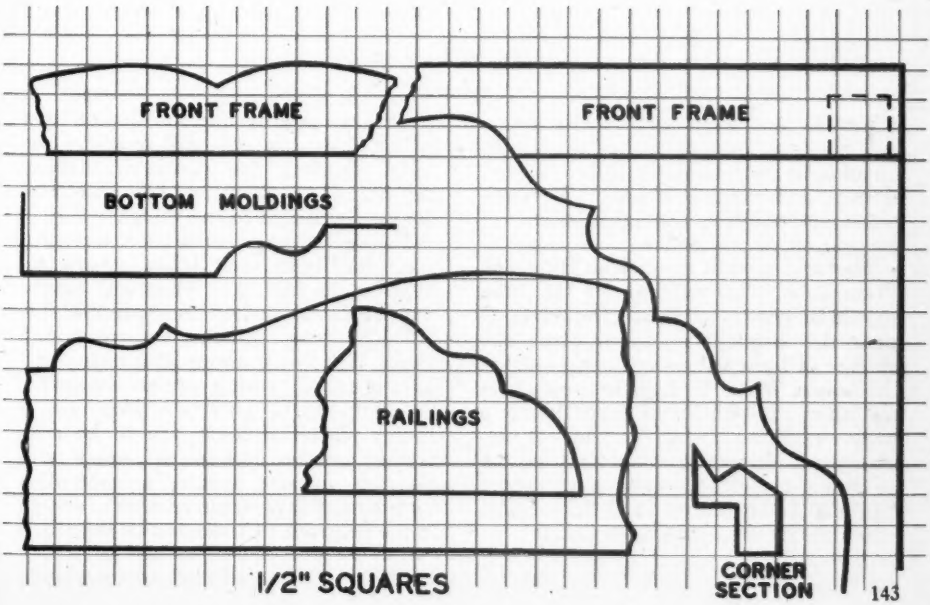


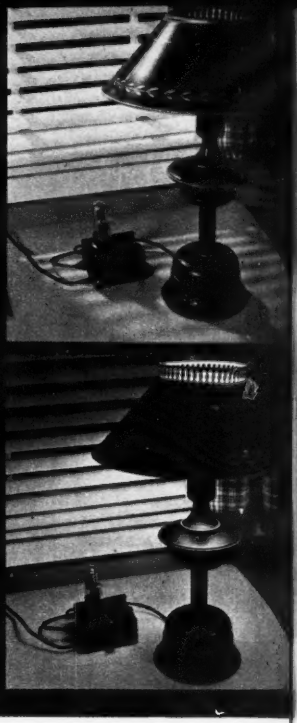
Front panel ready for finishing. The enclosure is designed for a 15-in. speaker.



A bottom view showing installation of the 1¼-in. cleats and four of the six casters.


RAILINGS 5/8"x3"
FASTEN TO TOP
WITH 3/8" DOWELS
SPEAKER TOP
3/4"x20-1/2"x35-1/2"
BACK RAILING
5/8"x4"
45° TAPER
INNER PANEL 2 REQD.
1/2"x17-1/2"x27-1/2"
LINE WITH 2" KIMSUL
INSULATION
CORNER SECTION
SEE DETAIL 2 REQD.
OUTER BACK
5/8"x15-1/2"x27-1/2"
3/4"sq. STRIPS
TOP & BOTTOM
11-1/2"
INNER BACK
1/2"x12-7/8"x21-1/4"
3/8" DOWEL
FRONT FRAME
2 EA. REQD.
5/8"x1-1/2"x27-1/2"
5/8"x1-1/2"x32-1/2"
COVER BACK WITH
GRILL CLOTH
SIDE PANEL
5/8"x12-1/2"x27-1/2"
12-1/2"
5-3/4"
1/2"x3/4" CLEATS
2 REQD.
57°
FRAME 1-1/2" STOCK
OVERALL 11-1/2"x27-1/2"
COVER BACK WITH
GRILL CLOTH
13-1/2" DIA.
2-3/4"
HINGES 4 REQD.
MOLDING
3/4" x 4" x 12-1/2"
CASTERS 6 REQD.
ONE EACH CORNER
20° MITER
SPEAKER PANEL
5/8"x27-1/2"x31-1/2"
BOTTOM
3/4"x19-1/2"x34"
ALL JOINTS GLUED &
SECURED WITH DOWEL
OR SCREWS
BASE MOLDING
3/4"x4"x35-1/2"
BASE MOLDING
3/4"x4"x11-1/2"
1-1/4"sq. CLEATS
FRONT & SIDE


FRONT FRAME
FRONT FRAME
BOTTOM MOLDINGS
RAILINGS
1/2" SQUARES
CORNER
SECTION



ELECTRONIC SENTRY

This photo-electric switch will scare off burglars by automatically turning lights on in your absence.

By L. V. Vog

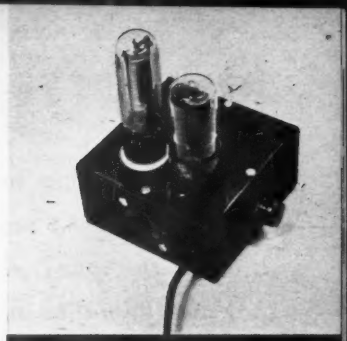
HAVE you ever gone away for a weekend or vacation and left a light burning in your house in order to keep thieves and vandals away? MI's electronic eye will turn the lights on and off for you, in your absence.

The unit is built around an RCA 868 Photo-tube. The reflector of the tube should be positioned facing the window, near the window, so as to catch the change of light values occuring outside the house. When the light intensity falling upon the photo cell drops below a pre-determined value, a relay is de-energized, closing the contacts to the auxiliary circuit, turning on the room lights. This happens toward the evening when the light outside starts to fail.

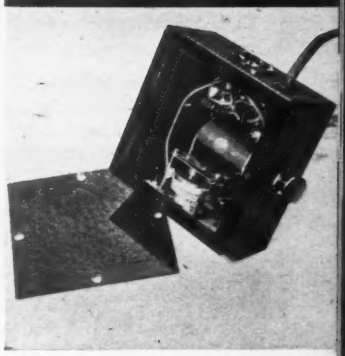
As dawn approaches, the outside light falling upon the cell will energize the relay, opening the contacts, thereby turning off the lamp or other electrical device connected to the unit.

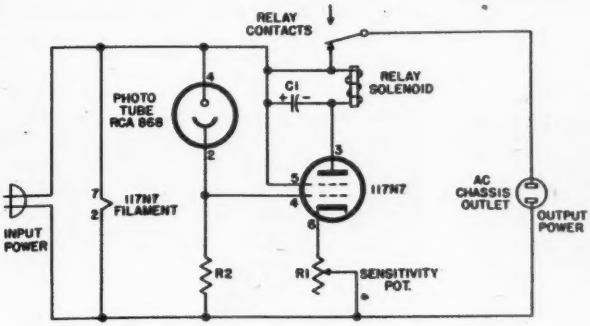
The switch may also be used to control signs, hall lights, stair lights, ornamental lighting, in fact, any electrical device required to be turned on or off at nightfall. The relay contacts are rated at 5 amps., 110 volts, about 550 watts, and as long as their ratings are not exceeded, the unit may be used as is. However, if larger electrical loads are to be controlled, another 110 volt AC relay with heavier contacts should be controlled by the smaller plate current relay shown in the diagram. [*Continued on page* 210]

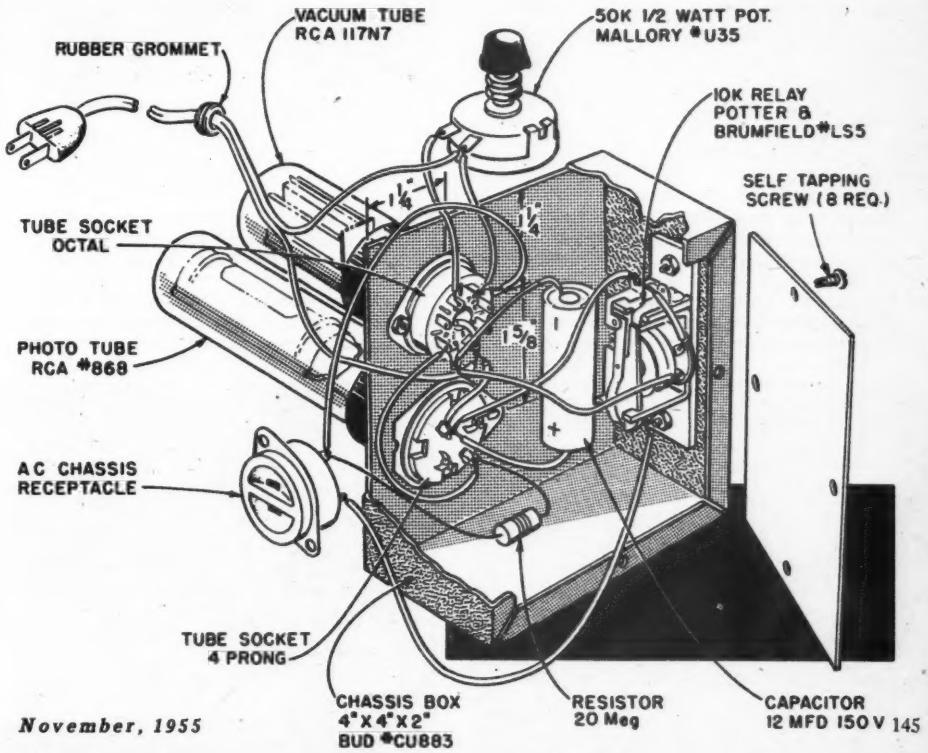
Unit is positioned with photo cell close to, and facing, window. Top photo shows daylight outside with lamp turned off. Below, the outside darkness, acting on the photo cell, automatically turns on table lamp.



Top photo at right shows assembled switch. Photo tube is mounted to the left of the 117N7 tube. Photo below shows underside, bottom cover removed. Note the knob of potentiometer R1, used to adjust the unit.







New Uses for Plastic Bags

You will certainly want to save those plastic food bags once you discover the many practical uses they may be put to in your home.

By Walter E. Burton

WHEN you bring home the week's groceries you usually acquire a number of plastic bags which, eventually, either wind up in the household collection of paper bags or get thrown away. But these plastic containers have more lives than an alley cat. After they have served their purpose as protectors of food items, wash and dry the bags and keep several on hand in the kitchen, garage and workshop, wherever chores may have to be performed. •

Plastic bags make excellent protective covers for glassware and china stored in cabinets. They keep dirt out, prevent chipping.

Snip the bottom of a plastic bag and you have a dandy sleeve protector. A rubber band will securely hold the bag at wrist.

To protect new or reconditioned paint brushes from dust, slip each one into a plastic food bag and tie up with a piece of string.

Most plastic food bag materials can be heat sealed. Plastic is sandwiched between paper and hot iron passed over line to be sealed.

The photographer will find many uses for food bags. To use a camera in wet weather cut hole for lens and shoot through bag.

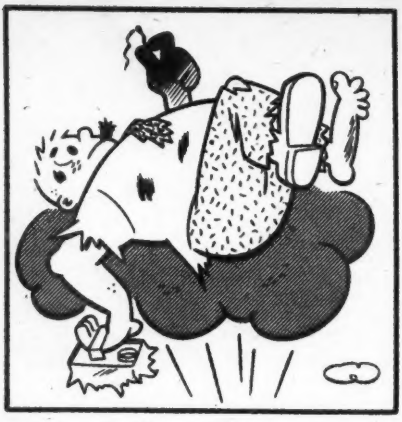
Cardboard signs posted outdoors in the rain will quickly become illegible. A plastic cover will give you excellent protection.

When traveling, food bags will keep hankies, towels, etc., clean and prevent soiled linen from touching other clothing or bag lining.

Pottery clay placed in a bag and tightly sealed will remain moist and pliable for a long time or until next work session.

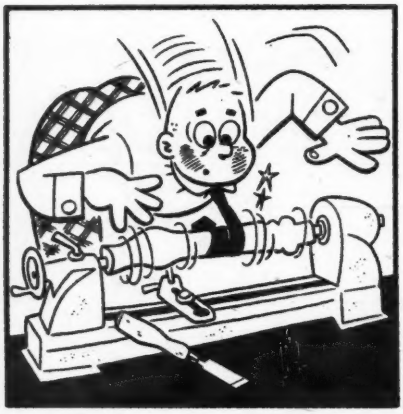
A flower may be kept fresh for a long time by slipping its stem into small plastic bag containing a pad of cotton soaked in water.

A piece of plastic makes an ideal surface for mixing resin glue or other adhesives. Plastic may be washed off and used again.



THE TEN COMMANDMENTS of Shop Safety

1. Never smoke when using inflammable liquids around the workshop.



2. Always wear your sleeves rolled up or tight fitting; don't wear a tie.

3. Get some assistance when moving or holding heavy and bulky objects.

4. Keep your eyes and mind on your work; don't let anything distract you.

5. Remove the plug before you repair any electrically operated machine.

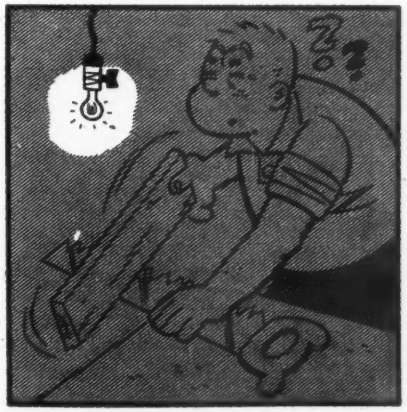
6. Never work when you are too tired and don't ever try to hurry the work.

7. Always wear goggles when there is the slightest chance of flying chips.

8. Store tools in their proper place and keep work area free and uncluttered.

9. Keep your shop well lit and have plenty of light directed on the work.

10. Always use a ladder when one is needed: don't try to improvise.



PARTITION PLANTER

Divide, but don't conquer, the spaciousness of your home by building an attractive, functional planter.

By John O. Bock

THIS modern partition planter is ideal for transforming a large living area into two smaller ones or, vice versa, making two small areas into a large one. In either case, each living area retains its own identity. The unit is so designed that 1¾-in. pipe stanchions (within aluminum sleeves) may be included or not, depending on whether or not a load-bearing wall is replaced.

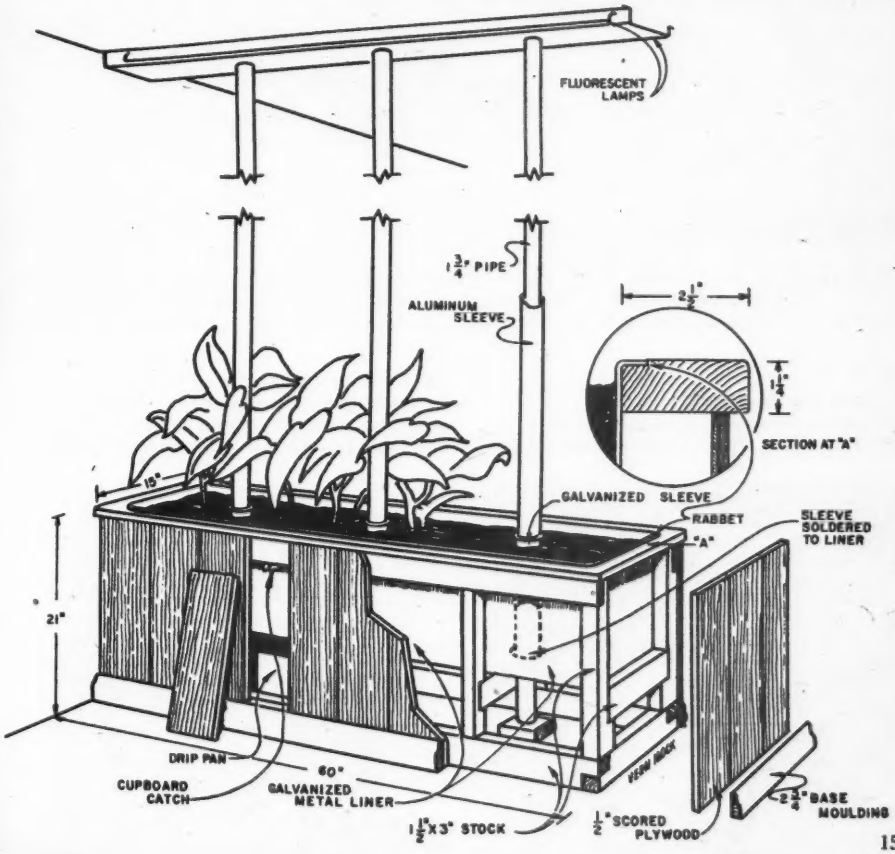
The galvanized metal flower box is 9¾-in. wide, 12 in. deep and 54¾ in. long. The top edge has a ½-in. flange which is set into a rabbet in the wood

cap. The stanchions (if used) are recessed into the wooden base blocks and pass through watertight sleeves which extend about ½ in. above the soil line. A small copper tube is soldered to the bottom of the box for a drain.

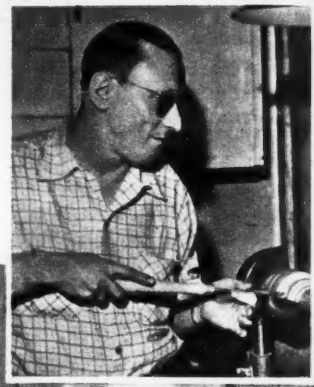
Make the wood frame of 1½x3-in. stock. Cut four pieces 55 in. long for the side members and two pieces 13 in. long for the ends of the bottom frame. Half-lap the bottom frame at the corners and nail or screw it to the floor. The four 14¼-in. corner uprights are recessed to accept two 10-in. crosspieces cut from the same stock and the tops are half-lapped to accept the top side pieces. Intermediate square uprights, 1½x14¼ in., are recessed for 11½-in. crosspieces which support the plant box.

Fluorescent lights, above the planter, materially stimulate plant growth. •

One panel is left loose in order to provide access to the drain pan. The scored plywood has beautiful, rustic appearance.



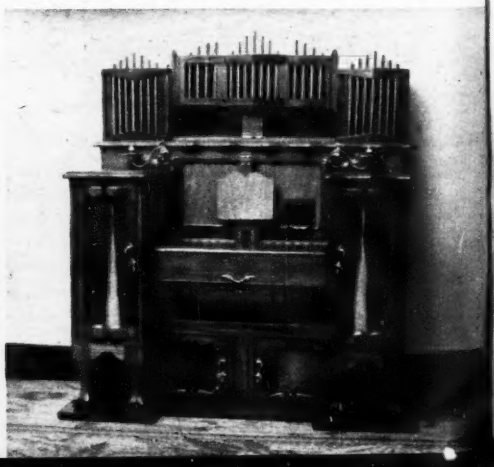
Golden Hammer Award Winners

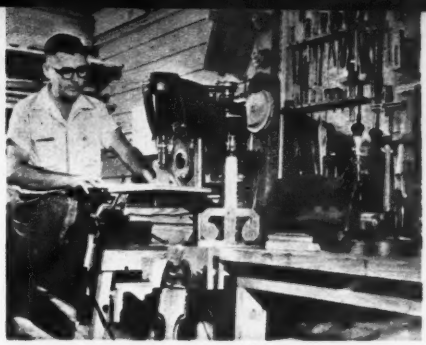


Wood turning is the hobby of Bill Frank, Chicago, Ill. He lost his sight in '45, has been turning out lamps, vases, lazy susans, etc., since 1954. His friends read MI to him. Photograph shows Y.M.C.A. exhibit of his work, inset shows Bill working at home on his lathe.

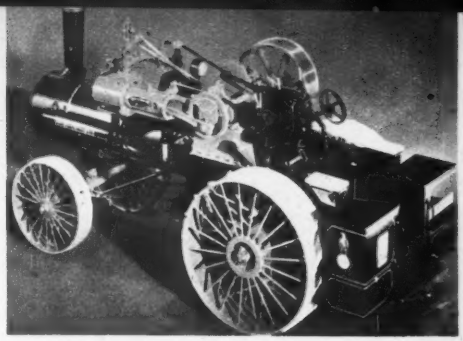
Sport car, Lampo, took three years to build; it matches the Jaguar XK 120M in performance—trunk lid opens electrically. Arthur J. Brow, Jr., Grand Rapids, Mich.

Hi-fi console in shape of organ, built by H. J. Olwage, Georginia, S. Africa. Unit includes: receiver, pre-amp, 8-in. woofer, 4-in. mid-range, 2-in. tweeter; turntable.





Workshop of J. A. Buck, Thomaston, Ala., includes drill press, jigsaw, circular saw and jointer, lathe and sander. All tables and racks for shop were built by Mr. Buck.



Model steam tractor is 11-in. high; 21-in. long; scaled one-inch to the foot. All-copper boiler has ten flues, 100 lbs. pressure. Bob Stenholm, Pine Crest Rd., Rockford, Ill.

The following craftsmen have been awarded GOLDEN HAMMER TIE BARS for their project:

Herschel Pilloff, Uhrichsville, Ohio. . . . Willis Frost Johnson, Great Neck, N. Y. . . . George Phillips, DuBois, Pa. . . . D. Van Horn, Sidney, Ohio. . . . William Carter, San Diego, Cal. . . . Sgt. Edward Johnson, New York, N. Y. . . . John M. Kinkead, Vandergrift, Pa. . . . Philip M. Griffin, Hamden, Conn. . . . Claude B. Stephens, Long Beach, Cal. . . . Joseph Correia, East Taunton, Mass. . . Owen R. MacDonald, Waltham, Mass. . . . G. Sanger, Ryckmans Corners, Ont., Canada. . . . Ted Phillips, Ft. Worth, Texas. . . . Charles E. Talbot, Fall River, Mass. . . . William Parnell, Byram, Conn. . . . Jack Stanner, Niles, Mich. . . . John Schuler, New Brunswick, N. J. . . . [Continued on page 190]

Each craftsman whose project is shown has received a 24 karat gold-plated Hammer and a Workbench Award Certificate. How about sending us a photo and full description of your latest project? If you aren't a winner, you may still receive a 14 karat gold-plated Golden Hammer Tie Bar or MI's Certificate Of Merit. Photographs of you and your workshop are also eligible for an award. Send entries to MECHANIX ILLUSTRATED Golden Hammer Awards, 67 West 44th Street, New York 36, New York. If you want entries returned, please enclose postage.

Golden Hammer Award tie bar.

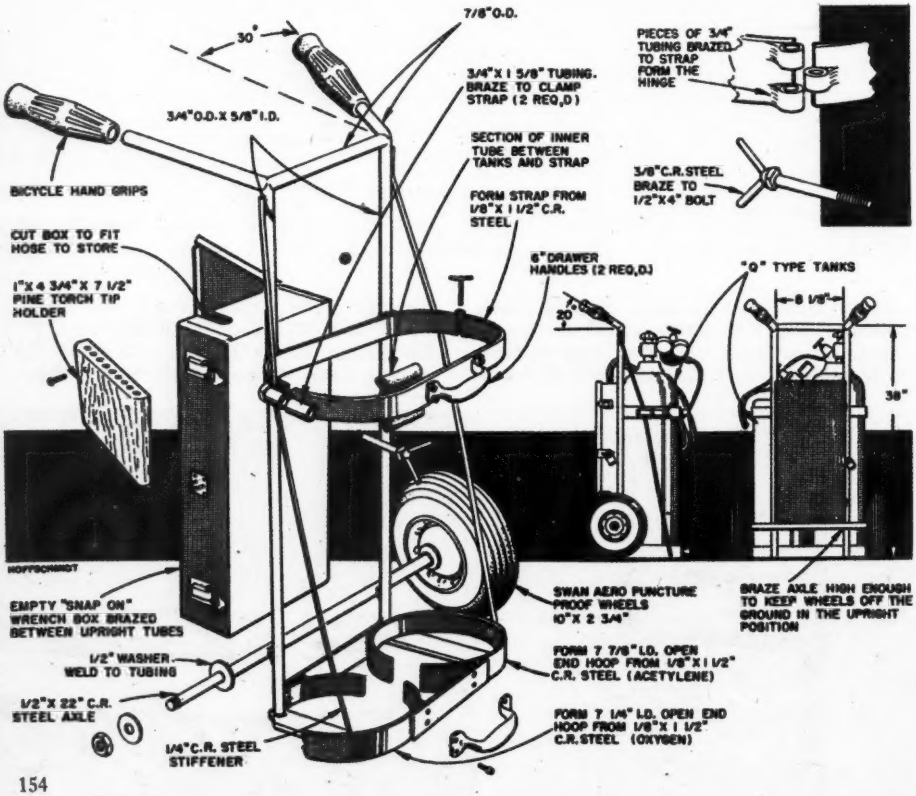
Early American dresser-cupboard made from MI plan F-14, by Ralph Atkins, Springfield, Mass. Knotty pine was used throughout; material cost $35; 40 hours of labor.

Shelter cabin cruiser built by L. Puent, La Crosse, Wis. Boat is 20 feet long, 8½ foot beam; will do 35 mph with its 102 hp engine. Photo shows builder at the wheel.

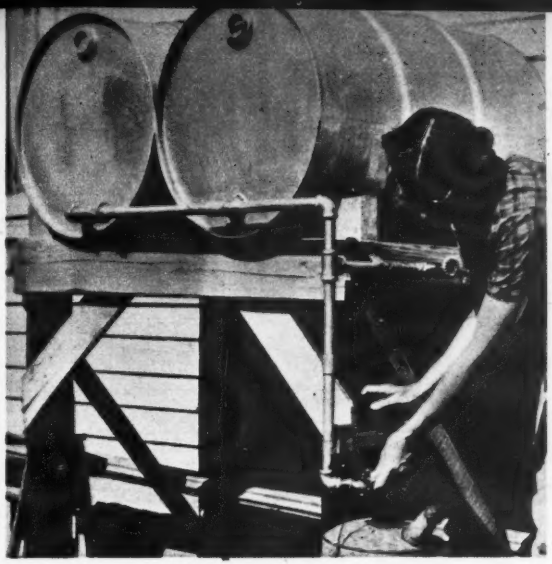
FARMER'S WELDING CART

HEAVY-WEIGHT electrical metallic tubing is used for the frame of this portable welding outfit. All joints are welded. The drawing below shows the simple construction. The half-inch diameter steel axle should be brazed to the frame high enough, so that the wheels will not touch the ground when the cart is in an upright position; it will then be supported by the two "Q" type tanks resting in their steel hoops.

Although designed mainly for farm use, home mechanics and others will find this unit extremely useful. •



The Farmer's Page

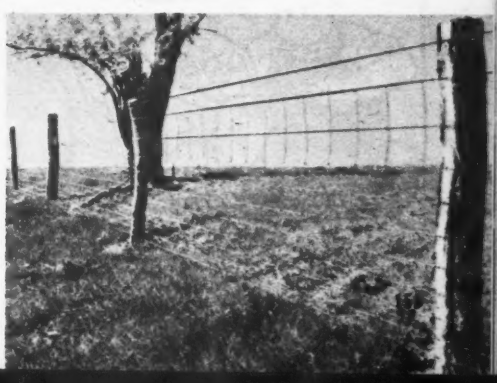


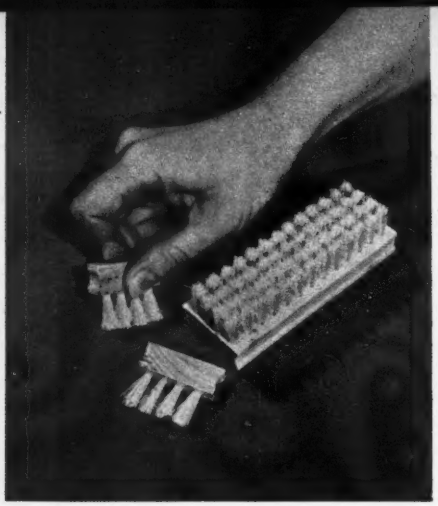
A house fuel supply (two 100-gallon drums) is fitted with extra length of pipe and a faucet so oil can be drawn for other uses.

Eyebolt mounted on bracket welded to the truck bed and a nut with a welded handle will hold the folded stock panel firmly.

Remove sod around base of an orchard tree and fill in with crushed slag. Mice can't burrow because slag continually caves in.

If a hatchet is used to skin off the bark and flatten one side of an unpeeled post, the staples will hold the fencing better.





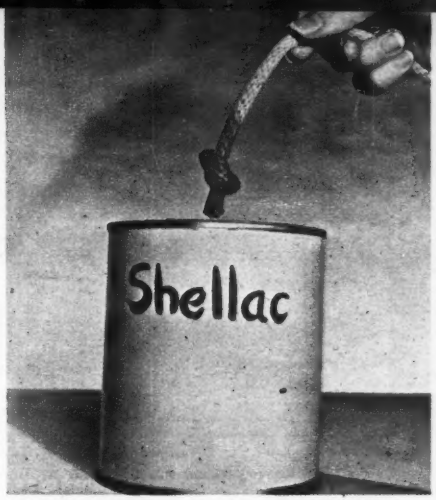
Brush slices make handy throw-away glue spreaders. Simply cut off a slice as you need one. The smallest scrubbing brushes are cheap, yield about fifteen spreaders.

Wire brush is made from screening and a shallow can. Cut long strips of screening when repairing or making a window screen. Make a roll, bind with wire, wedge in can.

Shop Tips

Saw for cutting nails and small bolts in tight quarters is made by bolting half of hack saw blade in 3½-in. length of dowel.

FREDDIE FUMBLES

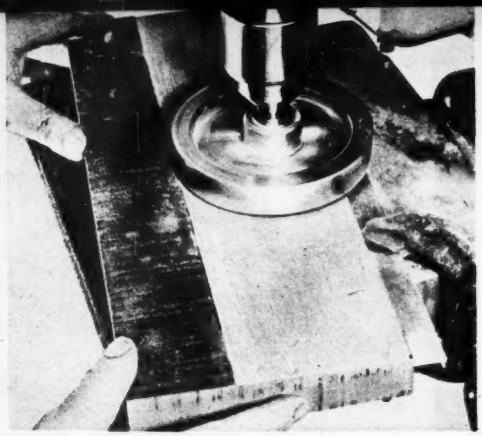


Secure knots tied at ends of lashings or other lines by giving them a quick dip in shellac or varnish. This will prevent the strands from unraveling when line is used.

Save solvents from splashing about when pouring by making a spout from the top of an old male electrical plug which is just the size for most openings on gallon cans.

Iodine is a good touch-up fluid for that scratched furniture. Color ranges from a pale yellow to mahogany, depending on the solution's strength. Apply with toothpick.

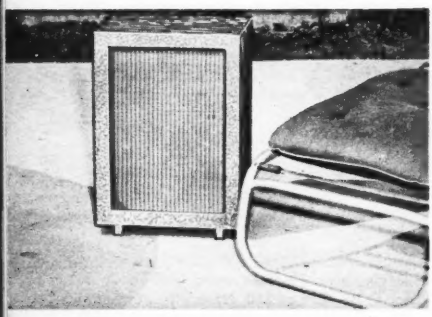
Send Freddie Fumbles your idea of a good short-cut, time-saver or safety device in your work, whether it be in the home, shop, office or farm. Each tip accepted will be paid for at the rate of $10. Naturally we cannot acknowledge or return the ones we cannot use. However all will be carefully read and evaluated. (Those which we can use in other departments of MI will be paid for at our regular rates.) Please send in your ideas on a post card only. Address to Freddie Fumbles, *Mechanix Illustrated*, 67 W. 44th St., New York 36, N. Y.



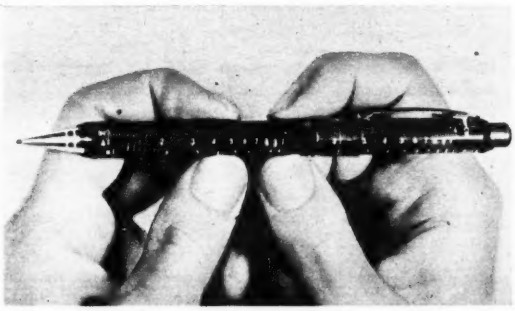
1. Kwik-Sand unit fits drill presses, lathes, etc. Standard 5-inch abrasive disks can be clamped onto unit in a matter of seconds.

2. TV Duette replaces small, side mounted speaker, resulting in increased frequency range; can be used for other hi-fi units.

NEW PRODUCTS

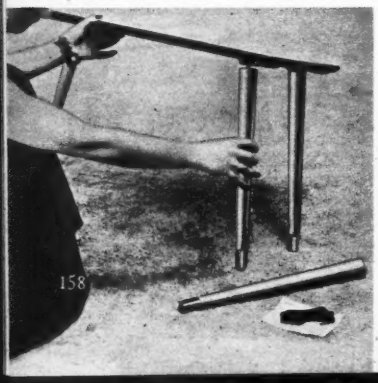


3. Portable hi-fi speaker enclosure, designed for outdoor use. Fiberglas insulated bass reflex compartment for 8 or 12-inch speakers.

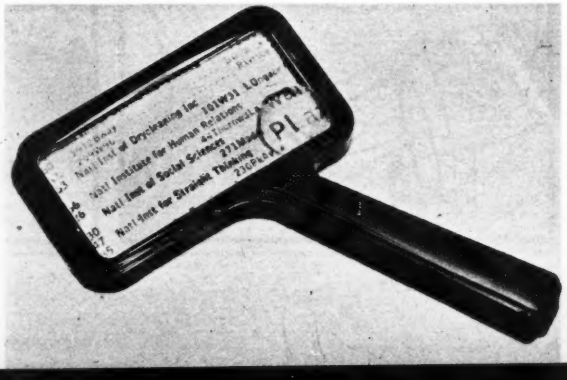


4. The 400 Devco slide rule pencil handles like conventional slide rule. The pencil, six inches long, comes in the 6 or 8 scale.

5. Hardwood legs, in various lengths, for straight or flare mounting. Steel bracket screws into furniture, legs fasten to bracket.



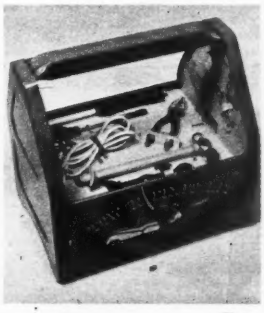
6. Bi-Focal magnifying glass has 2x4 inch lens with 2.5X magnification. Round lens inset in corner gives 5X magnification.

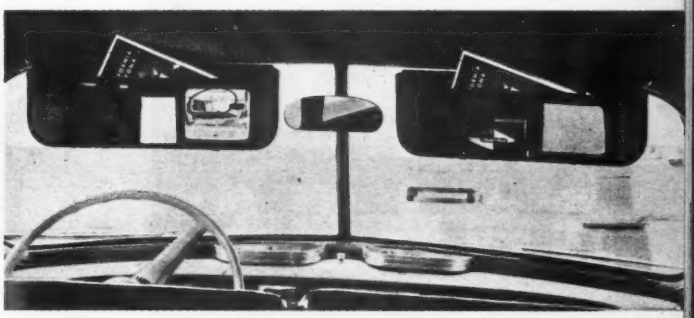


7. Ciq-O-Mat plugs into auto lighter socket, replacing regular lighter. By pressing on button, inserted cigarette will light up.

8. The Kodak Pony 135 has an Anastor f-3.5 lens; 1/300 sec. top speed. No-thread loading, automatic film stop, exposure counter.

1. Creative Products Co., P.O. Box 66, Wilmette, Ill.; 2. Jensen Mfg. Co., 6601 S. Laramie Ave., Chicago, Ill.; 3. Manfredi Wood Products Corp., 226 New York Ave., Huntington, N. Y.; 4. Device Development Co., 226 W. 4th Street, New York, N. Y.; 5. Dennix Products Co., 78 Fifth Ave., New York, N. Y.; 6. Scope Instrument Corp., Scope Bldg., Mamaroneck, N. Y.; 7. Gaylord Wood, Fort Lauderdale, Fla.; 8. Eastman Kodak Co., Rochester, N. Y.; 9. American Metals Specialties Corp., Hatboro, Pa.; 10. U. S. Associates, Inc., 2170 W. Venice Blvd., Los Angeles, Cal.; 11. Malibu Archery Co., 1036 S. La Brea Ave., Los Angeles, Cal.; 12. Barnes Corp., Wadsworth, Ohio.



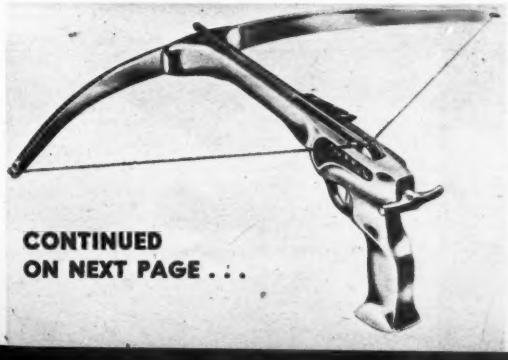


9. Everything for the junior mechanic is included in the Tow'n Fixit Kit: wrenches, hammer, pliers, screwdriver and tow rope.

10. Travel Visette fastens to any car visor. It contains zipper pocket for maps and papers, a sun glass case, pencil and memo pad.

11. Pow-R-Mite, made of aluminum, is capable of shooting 150 yards. Intended for small game, it will penetrate a fox at 30 yds.

12. Pot-A-Wall tire sidewalls are held in place between rim flange and tire bead. Will give black tire a white or colored wall.



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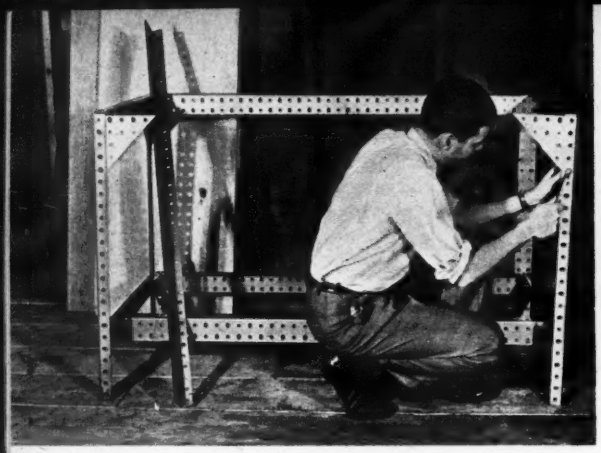
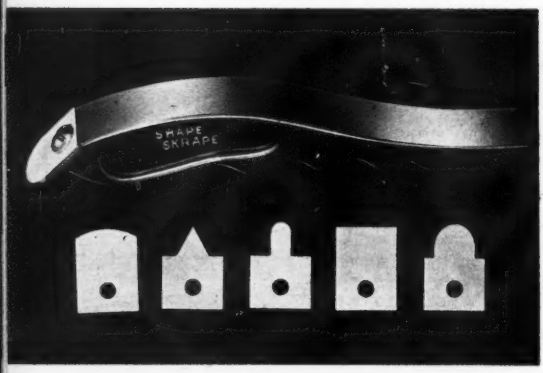
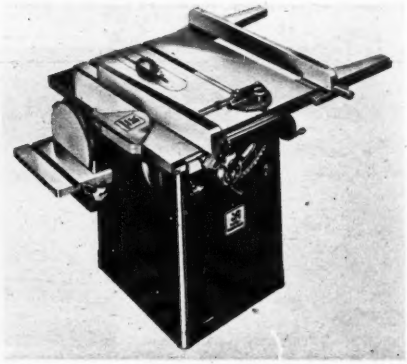


13. Pre-cut kit for a metal-framed work bench can be assembled in 30 minutes. Plywood panels for top are not included in kit.

14. Handy-Dandy reseals bottles factory tight with original cap. It is also a bottle opener, can piercer, lid and cap lifter.

13. Structo System, Inc., Elyria, Ohio; 14. Abbett's, 1148 First Ave., San Diego, Cal.; 15. Adams Products Co., 119 Ann St., Hartford, Conn.; 16. Yates American Machine Co., Beloit, Wis.; 17. Mall Tool Co., 7725 S. Chicago Ave., Chicago 19, Ill.; 18. Columbia-Lamina, P.O. Box 306, Falls Church, Va.



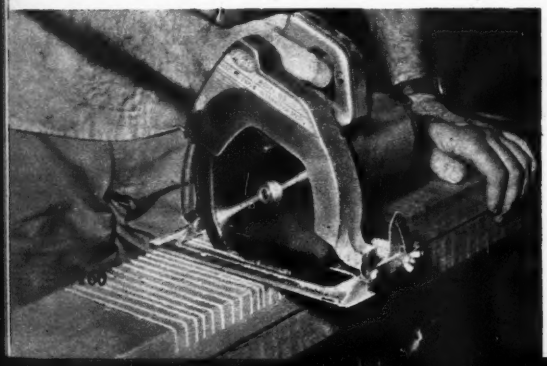


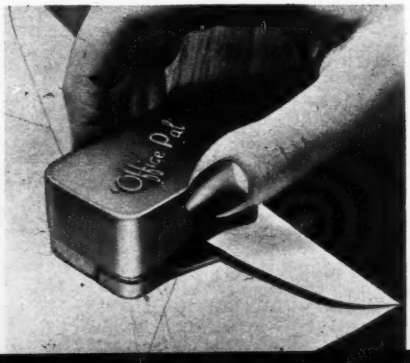
15. Shape-Skrape, a contour scraping tool with six differently shaped steel blades. Photo above shows shapes of the metal blades.

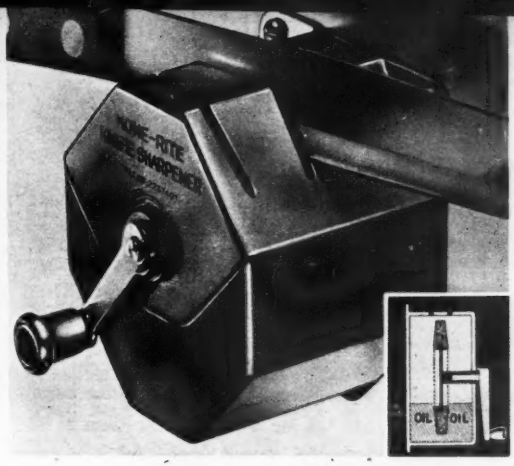
16. Single-unit, multi-purpose power tool with instant changeover from an 8-inch saw to a jointer or sander, by turn of a wheel.

17. This high speed 6½-inch circular saw will cut Masonite, sheet metal, wood, etc. Motor is AC-DC 25 to 60 cyc.: 5 amp at 115 v.

18. Office Pal will moisten and seal the flap of an envelope with one motion. The small lightweight unit fits in palm of hand.



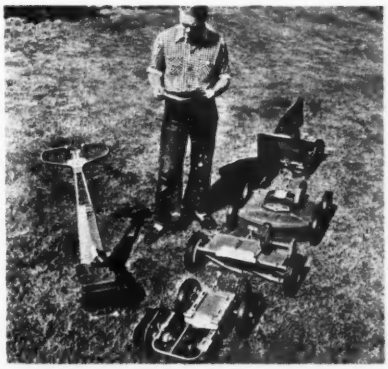


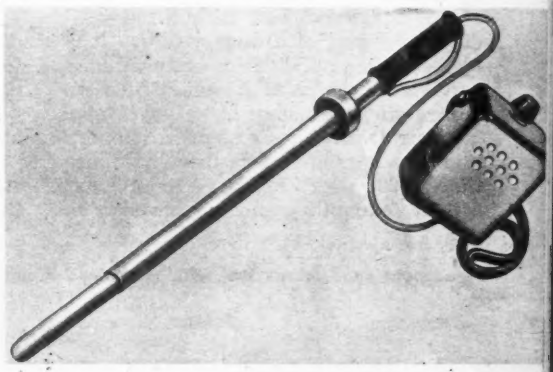


19. The Hone-Rite knife sharpener will give you oil honed knives. Guide slots hold knife at proper angle while blade sits in oil bath.

20. Carburetor attachment eliminates vapor lock and improves engine operation. Unit comes in kit form for easy installation.

19. Wulff Mfg. Co., Ontarioville, Ill.; 20. Penn Aircraft Prod. Inc., 915 Valley St., Dayton 4, Ohio; 21. Toro Mfg. Corp., 3052 Snelling Ave., Minneapolis, Minn.; 22. Universal Atomics, Inc., 19 East 48 St., New York, N. Y.; 23. Christy Chemical Corp., 21 Putnam Lane, Worcester 4, Mass.; 24. Hi-Lok Mfg. Co., 1625 Massillon Rd., Akron, Ohio.



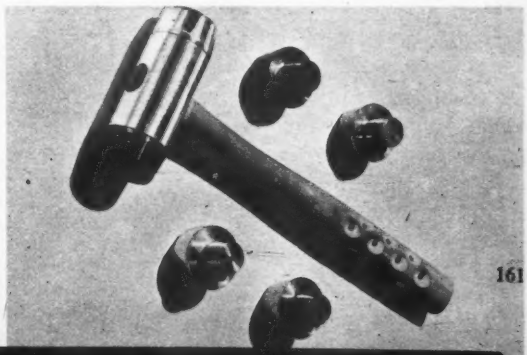


21. The Power Handle can be fitted on, and will operate, Toro's edge-trimmer, lawn mower, rotary mower, 17-inch snow plow.

22. A Walking Stick Geiger Counter, weighs three pounds, is 40 inches long. Unit runs on a snap-in transistorized power supply.

23. Tabs, a detergent concentrate for automatic windshield washers. The tablet dissolves in the water of the car's washer jar.

24. The Hi-Lok hammer comes with interchangeable heads of: aluminum, brass, copper, two types of nylon, three of plastic.



EXPANDING TRAILER

A family desire to travel at minimum cost was realized by building this inexpensive trailer.

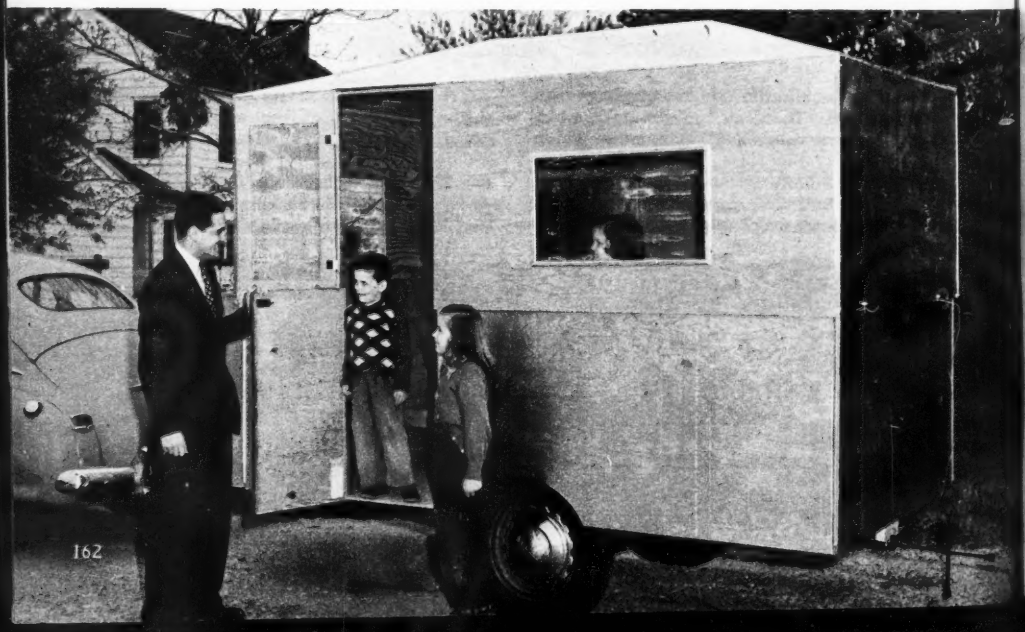
By Eugene C. Winslow

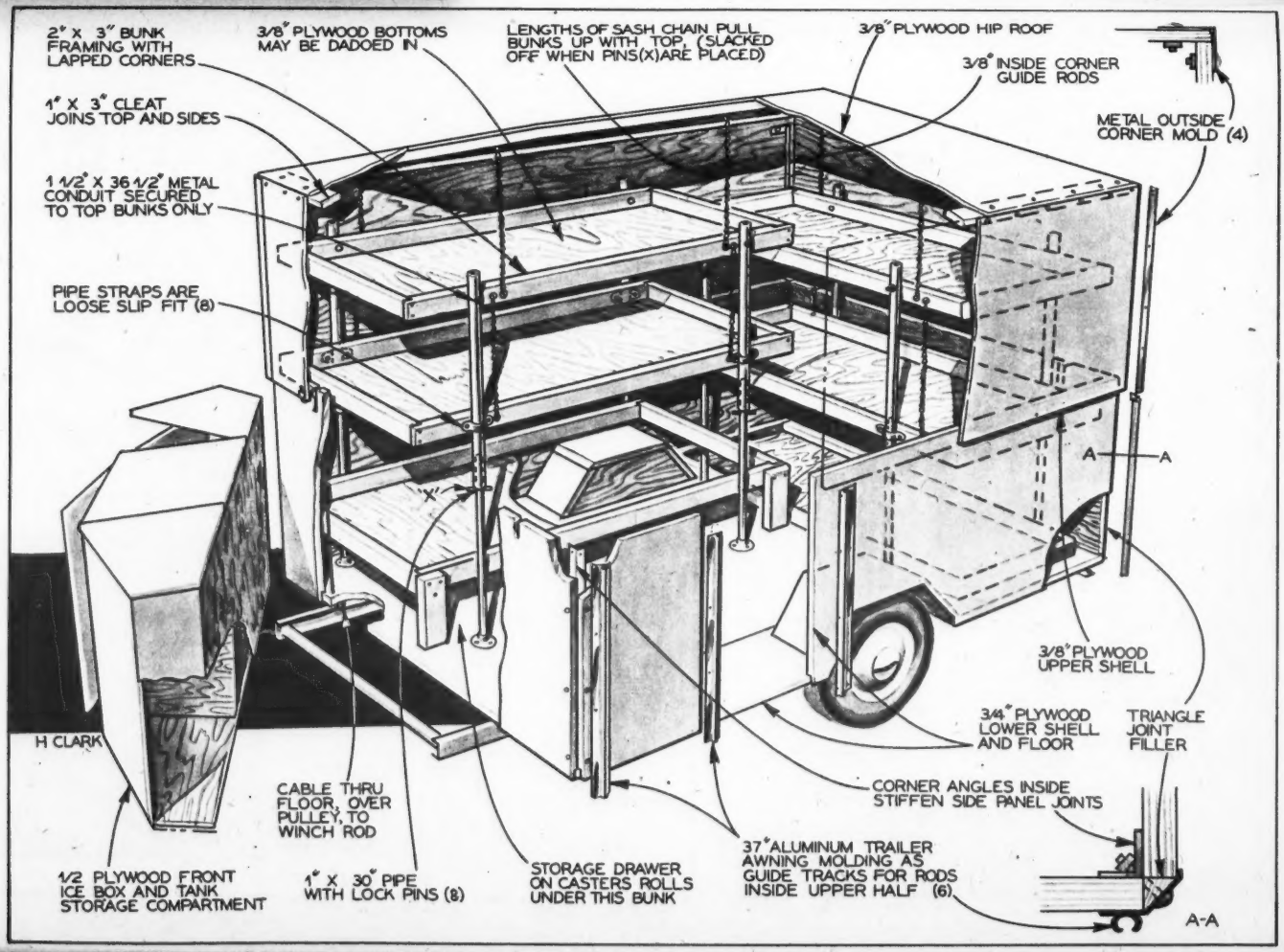
THIS trailer, as it travels, is a compact plywood box with three windows and part of a door visible. It is 9½ feet long, no wider or higher than a car, and looks as if it would hold no more than the luggage for a few people. Yet our family of six slept in it every night for a month while traveling more than 3,500 miles. It proved to have excellent roadability and we towed it to places inaccessible to other trailers.

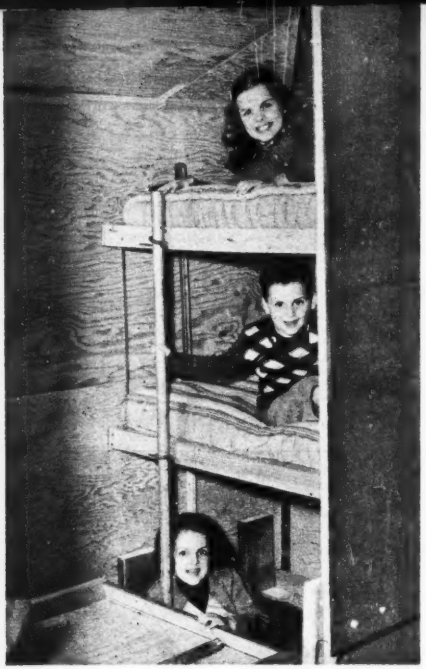
The trailer is built on the rear end of a 1937 Ford. A rectangular frame, ten feet long and just wide enough to fit between the brake drums, is made of 3-in. channel iron and is fastened to the axle by means of U bolts.

The bottom half of the trailer is constructed of ¾-in. exterior plywood. The floor is attached to the channel frame

Headroom exceeds six feet with top raised. Crank, lower right, was later moved to side.




2" X 3" BUNK FRAMING WITH LAPPED CORNERS
3/8" PLYWOOD BOTTOMS MAY BE DADOED IN
LENGTHS OF SASH CHAIN PULL BUNKS UP WITH TOP, (SLACKED OFF WHEN PINS(X)ARE PLACED)
3/8" PLYWOOD HIP ROOF
3/8" INSIDE CORNER GUIDE RODS
METAL OUTSIDE CORNER MOLD (4)
1" X 3" CLEAT JOINS TOP AND SIDES
1 1/2" X 36 1/2" METAL CONDUIT SECURED TO TOP BUNKS ONLY
PIPE STRAPS ARE LOOSE SLIP FIT (8)
A
A
"X"
3/8" PLYWOOD UPPER SHELL
3/4" PLYWOOD LOWER SHELL AND FLOOR
TRIANGLE JOINT FILLER
H CLARK
CORNER ANGLES INSIDE STIFFEN SIDE PANEL JOINTS
CABLE THRU FLOOR, OVER PULLEY, TO WINCH ROD
37" ALUMINUM TRAILER AWNING MOLDING AS GUIDE TRACKS FOR RODS INSIDE UPPER HALF (6)
1/2 PLYWOOD FRONT ICE BOX AND TANK STORAGE COMPARTMENT
1" X 30" PIPE WITH LOCK PINS (8)
STORAGE DRAWER ON CASTERS ROLLS UNDER THIS BUNK
A-A



Three young members of the family try out the bunks in the newly completed trailer.

with angle irons at eight points. The sides are 37 in. high and are mortised into the floor. The method used to join the corners of the bottom half is detailed as section A-A in the drawing on the preceding page.

The top half slides up and down on six tracks which are made of aluminum trailer awning molding. These are fastened to each of the corners and to each side of the door. Metal rods (⅜-in. dia.) are fastened to the top and bottom of the movable top half by small angle irons. These rods slide up and down in the aluminum molding tracks and steady the top.

A six-foot steel rod (⅝-in. dia.) is fastened to the bottom of the floor near the middle. This is secured at six points with two mandrel bearings and four eyebolts. Aircraft control cables are attached at four points on the rod and a crank is installed at one end. By a system of pulleys, the cables go through holes at the edge of the floor and are looped over the edge of the bottom half of the trailer and then attached to the bottom of the top half of the trailer. When the rod is turned by the crank, the cables pull the top up.

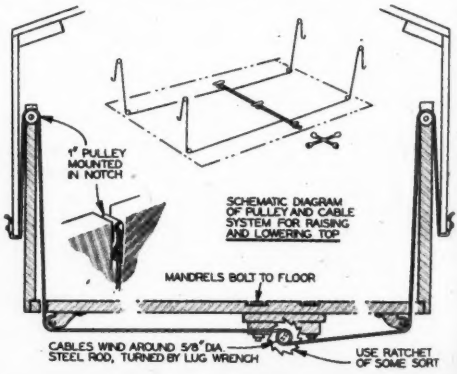
The bunks also go up with the top. They are stabilized by 1-in. galvanized pipes 30 in. long which are screwed into the floor. The bunks, themselves, are attached to a 3-ft. length of metal conduit (1¼-in. dia.) which slides over the fastened pipes. The eight 30-in. base pipes are drilled for steel pins which lock the bunks in the raised position. •

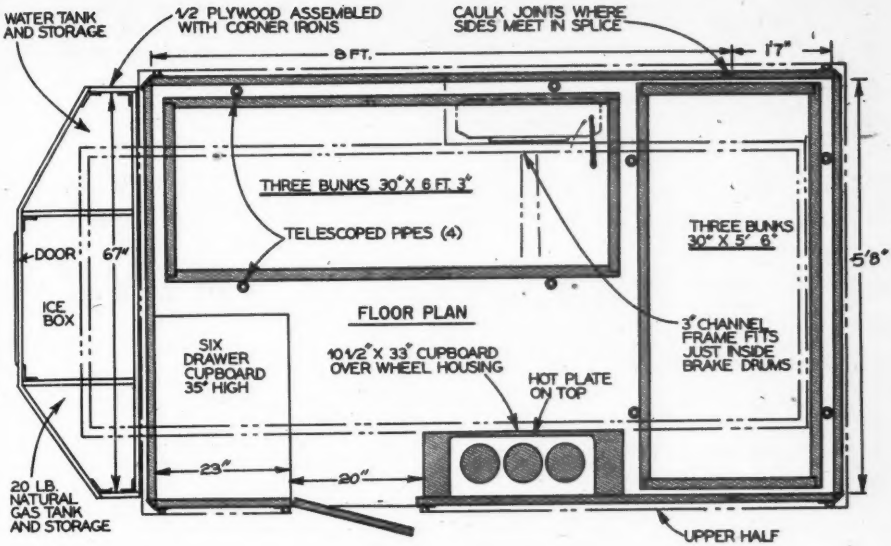
PARTS LIST

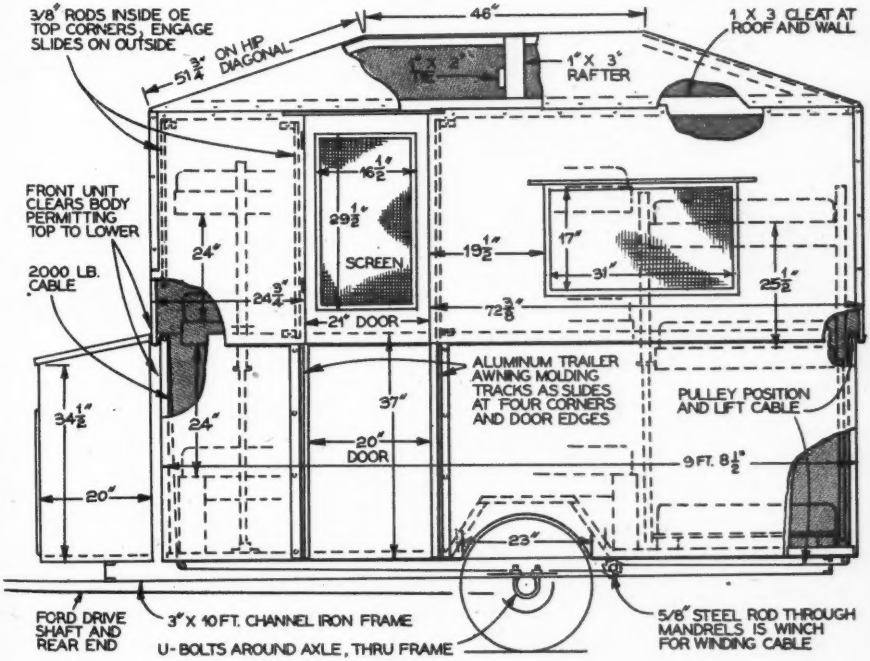
This list includes major items only. Bunks and interior storage compartments are excluded.

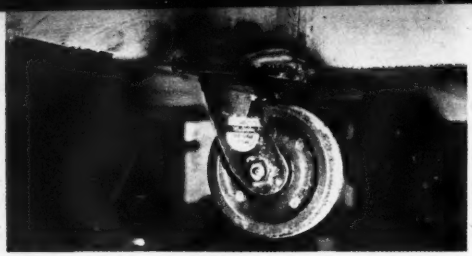
8 panels, 4'x8'x⅜", for upper siding and roof
6 panels, 4'x8'x¾", for lower siding, floor, wheel housing, etc.
2 panels, 1'x8'x½", for front storage compartments
Lumber, 12'x1"x3", for rafters
1 steel rod, 6'x⅝" dia.
Aircraft control cables (2,000 lbs. breaking strength), 52'
8 pulleys, 1"
2 mandrel bearings, ⅝"
4 conduit straps, ¾"
Chrome inside corner molding, 12'
Chrome outside corner molding, 12'
Aluminum trailer awning molding, 18'
Metal rod, ⅜", 18'
Screening, 2 yards

Closeup shows cranking-up operation.



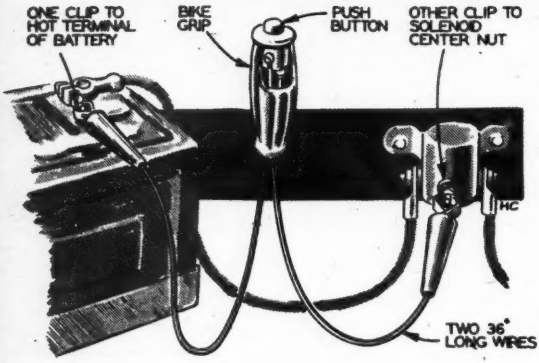

WATER TANK AND STORAGE
1/2 PLYWOOD ASSEMBLED WITH CORNER IRONS
CAULK JOINTS WHERE SIDES MEET IN SPLICE
8 FT.
17"
THREE BUNKS 30" X 6 FT. 3"
TELESCOPED PIPES (4)
THREE BUNKS 30" X 5' 6"
5'8"
DOOR
67"
ICE BOX
FLOOR PLAN
SIX DRAWER CUPBOARD 35" HIGH
10 1/2" X 33" CUPBOARD OVER WHEEL HOUSING
HOT PLATE ON TOP
3" CHANNEL FRAME FITS JUST INSIDE BRAKE DRUMS
23"
20"
20 LB. NATURAL GAS TANK AND STORAGE
UPPER HALF


3/8" RODS INSIDE OF TOP CORNERS, ENGAGE SLIDES ON OUTSIDE
46"
1 X 3 CLEAT AT ROOF AND WALL
51 3/4" ON HIP DIAGONAL
1" X 3" RAFTER
16 1/2"
29 1/2"
SCREEN
FRONT UNIT CLEARS BODY PERMITTING TOP TO LOWER
24"
2000 LB. CABLE
24 3/4"
21" DOOR
19 1/2"
17"
31"
25 1/2"
72 3/8"
ALUMINUM TRAILER AWNING MOLDING TRACKS AS SLIDES AT FOUR CORNERS AND DOOR EDGES
PULLEY POSITION AND LIFT CABLE
34 1/2"
24"
37"
20" DOOR
9 FT. 8 1/2"
20"
23"
FORD DRIVE SHAFT AND REAR END
3" X 10 FT. CHANNEL IRON FRAME
U-BOLTS AROUND AXLE, THRU FRAME
5/8" STEEL ROD THROUGH MANDRELS IS WINCH FOR WINDING CABLE

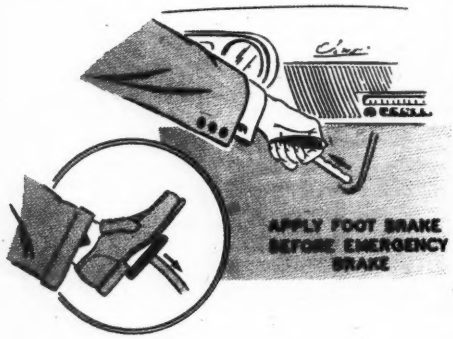


To prevent damage to the rear end of your trailer on rough roads, weld a 5,000 lbs-tested, cold-forged caster to each corner of chassis.

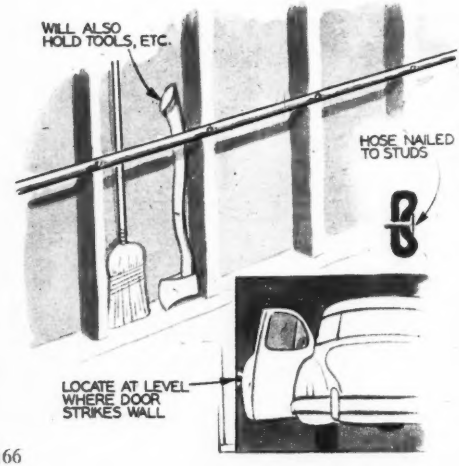
CAR KINKS



When making repairs on your car an extra push button starter is a big help. Drawing left shows all parts needed to build this handy gadget.

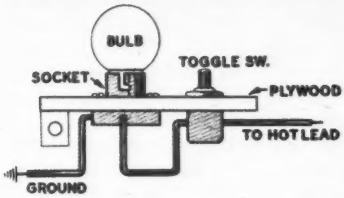


To prevent brake failure due to air passing between piston and cylinder always step on hydraulic foot brake before applying hand brake.

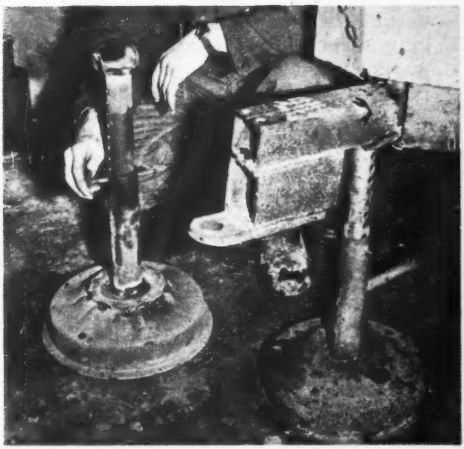


In a narrow garage tack a short length of garden hose to the wall at the height where door touches to prevent damage to car finish.

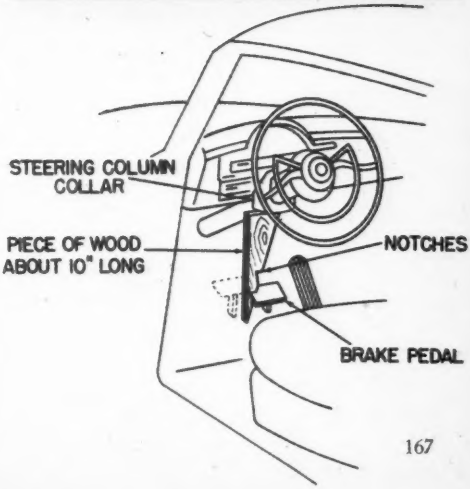
Make car trunk light from a toggle switch, a single-contact, bayonet-base socket, a piece of plywood or Masonite and two small L brackets.



Extremely sturdy jacks can be made out of old auto or truck brake drums and pipe sections. The larger diameter pipe is welded to drum, and holes for height adjustment are drilled at half-inch intervals through both the stationary and telescoping pipes.



Positive brake holder is good when car is jacked up. Also, once cut to size, future slippage of wedge indicates a leak or excessive shoe wear.

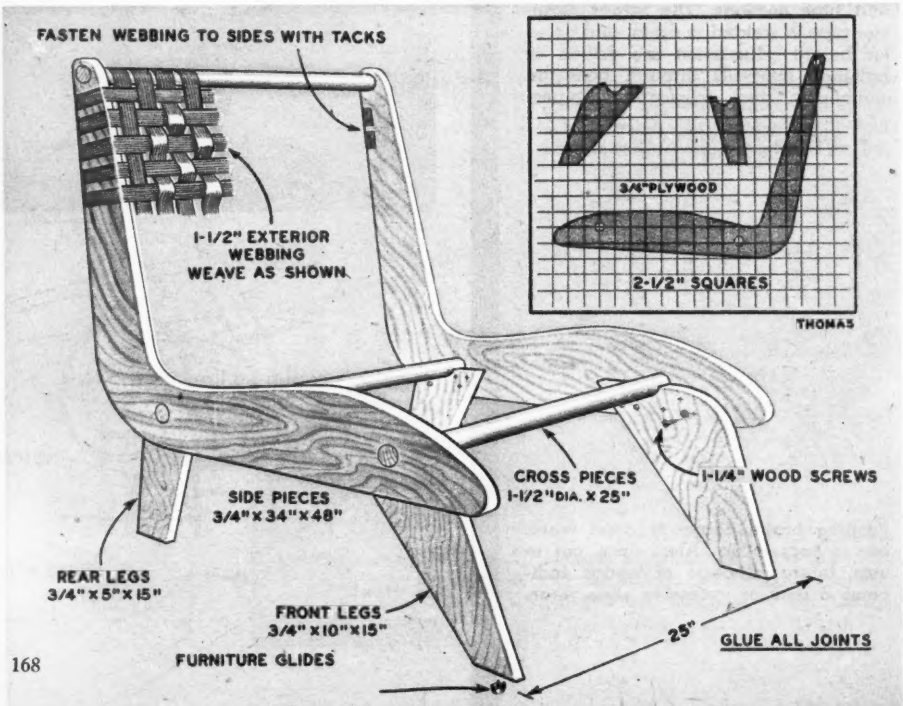


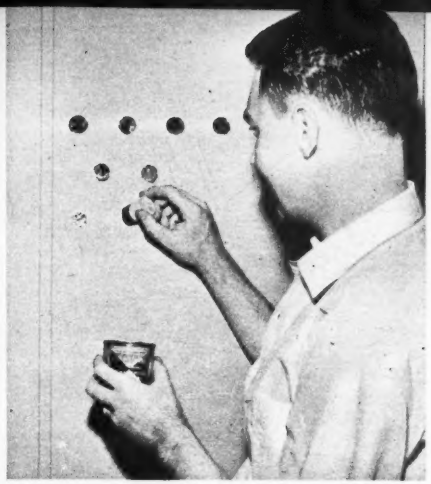
SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

WEEKEND PROJECT

MODERN WEB CHAIR

THE smart design of this webbed contour chair makes it readily adaptable to either the living room or the patio. The framework is made entirely from ¾-inch plywood and 1½-inch hardwood dowel. When the two side pieces have been cut to size, lay one over the other so that the holes for each crosspiece can be bored at the same time. If the bit is kept perpendicular, this will assure alignment. Sand all parts and assemble them as shown. The legs are fastened to the side pieces with glue and No. 8, 1¼-inch flathead screws. Finish the wooden parts with paint or stain and varnish before application of the webbing. Webcraft, Oxford, Mass., will forward a variety of samples on request. Begin by putting on all the horizontal strips first. It is then simple to weave the vertical strips in and out among the horizontal. For such a chair, time and cost are minimum.—*M. Grassell* •



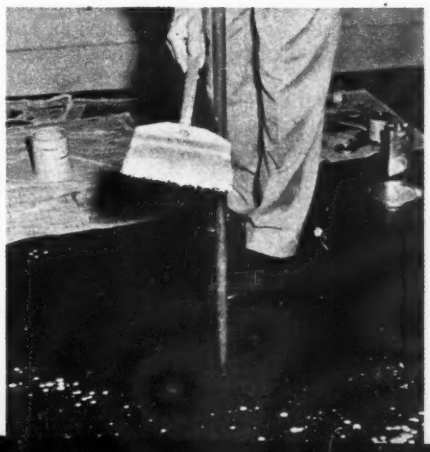


FRESH PAINT TIPS

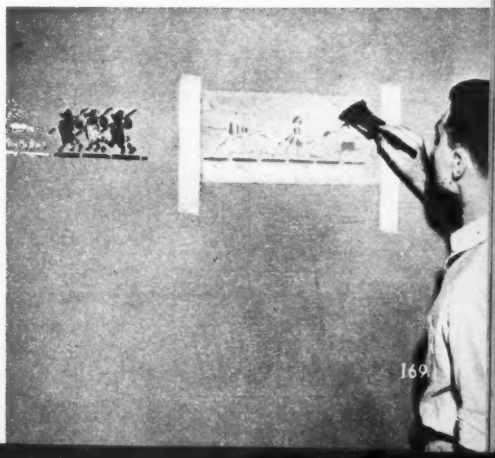
To get polka dot design, dip a cork into paint and press gently to wall. Snap chalked string against wall to serve as guide line.

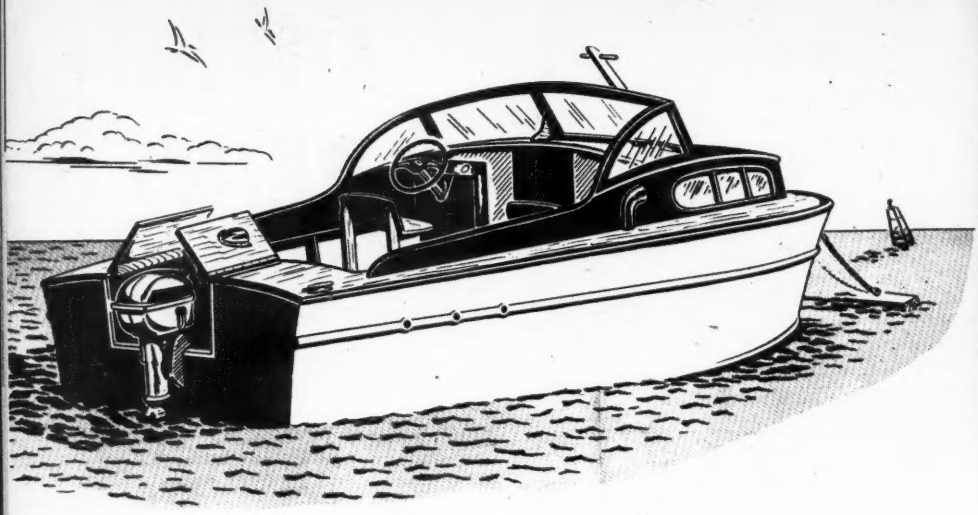
Small portions of plaster can be mixed in one half section of a rubber ball. To clean, turn ball inside out and knead in your hand.

Spatterdash on solid color wood or linoleum gives colorful design. Several colors of paint, a wide brush and a stick will do it.



You can repeat any of your own pet designs easily by simply tracing them onto piece of stencil paper and cutting out patterns.



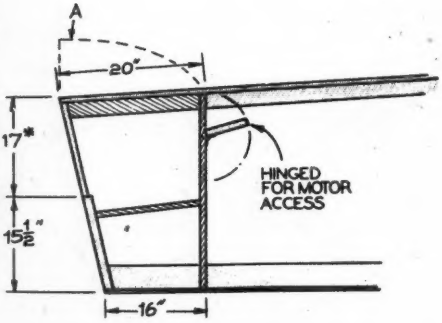


Enclosing the Outboard

Keep out a following sea and tone down the noise by enclosing the outboard in a self-bailing well.

By F. C. Clark

THE transom cut for the engine on many an outboard cruiser is so low that a following sea has no trouble climbing into the boat. No matter how good the skipper's intentions, there are times when he's caught out in rough weather and the low cut becomes dangerous.



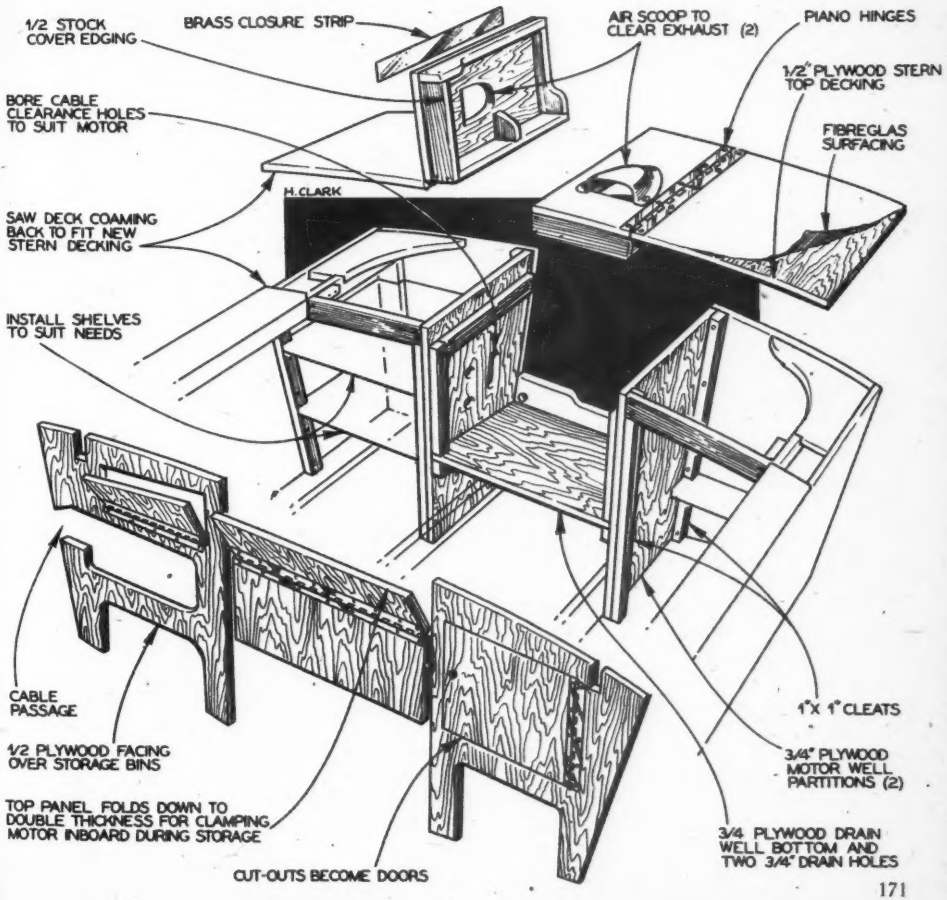
* IF THIS DIMENSION IS NOT 17" OR MORE, ADD CURVED HOOD OR BRIDGE DECK 'A'

I've found that the best answer is to merely enclose the engine on three sides with lockers and a self-bailing well. At first thought, an enclosure running the full width of the cockpit, and extending some 20 in. inboard of the transom, may seem to take up too much space in an area already small. In practice, however, such an arrangement actually added to the size of the boat by providing for the orderly housing of cables and gear. In addition, appearance was improved and motor noise deadened. Fiberglas or Stryofoam insulation in the well will deaden the noise even more.

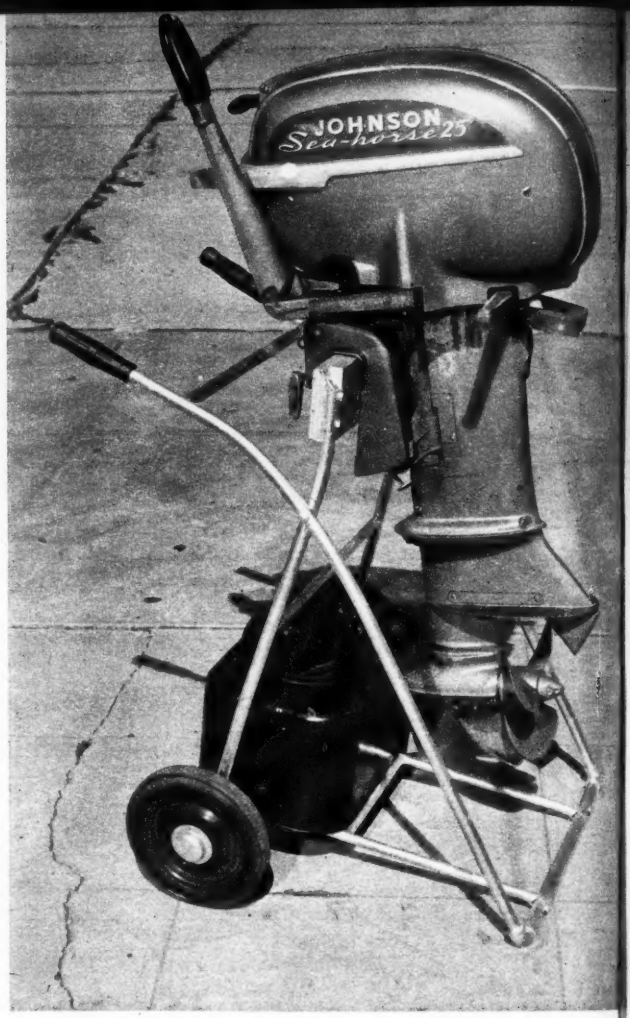
Dimensions of the enclosure will vary, depending on the boat and motor. Just mount the motor (or motors) on the transom and run through all tilts and swings—size of the enclosure will be obvious. Remember drain holes at rear of well and ventilate properly, else the engine will cough and die. •

Gas line and steering cable holes. Shape opening so that steering cable won't rub.

Top panel of false transom is folded down, outboard clamped inboard for trailer move.



OUTBOARD MOTOR CART



Those big, heavy outboards are easy to handle with a cart like this.

By Howard Rozelle

THIS outboard motor cart has everything. It's strong enough to handle a 40-horsepower engine; it's rigid enough to allow it to be used as a repair stand, even to cranking; it hauls a gas tank, with room left for a tool box; it's so well balanced that a child or a woman can move a big engine easily; and it folds compactly in 10 seconds by removing one pin which also locks it in the folded position. What's more it's light, easy to build and cheap.

If the materials are salvaged from scrapped toys and discarded pieces of pipe, it can be built for as little as $1.75. Even if used materials are purchased and spot welding is paid for, the cost shouldn't exceed seven dollars. A cart incorporating all its features would sell for a good deal more.

The simple construction is detailed in the drawing. Beyond what is shown, little information is required. Note, in the illustration at the upper right of the next page, that the handles are bent outward. The width at the pivot is only 19½ in.—slightly too narrow. A few inches above the pivot, the pipes are bent so that the width at the ends of the handles is 22 in. Another thing that

bears mention is that the hole in the outer pipe at the pivot should be reamed slightly larger to allow for the bolt wobble caused by the bend of the pipes at this point.

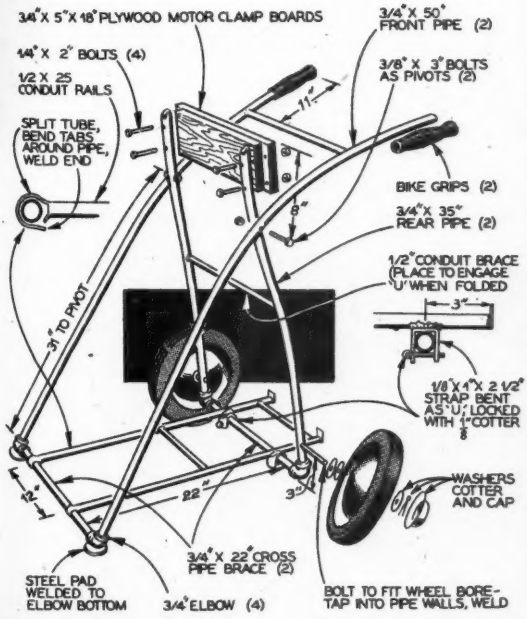
Wheels are 10-in. diameter, but 8 or 12-in. may be used if slight alterations are made in the dimensions. The axles are mounted in holes drilled through the support pipes and then spot welded. Hub caps are used as dressing.

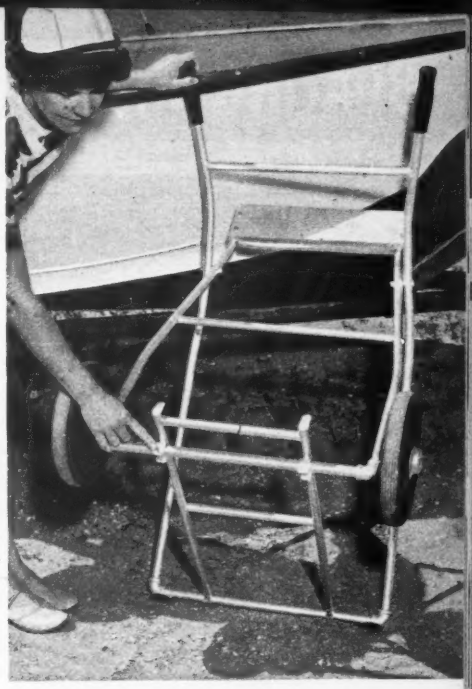
Pipes must be threaded where elbows are used at the joints. Spot welding is used elsewhere. The crosspiece beneath the wooden mount is cut to size and welded in position where the U brackets will engage it when the cart is folded.

Vertical tabs, welded at the ends of the platform, prevent a gas tank or tool box from sliding off. •

BILL OF MATERIALS

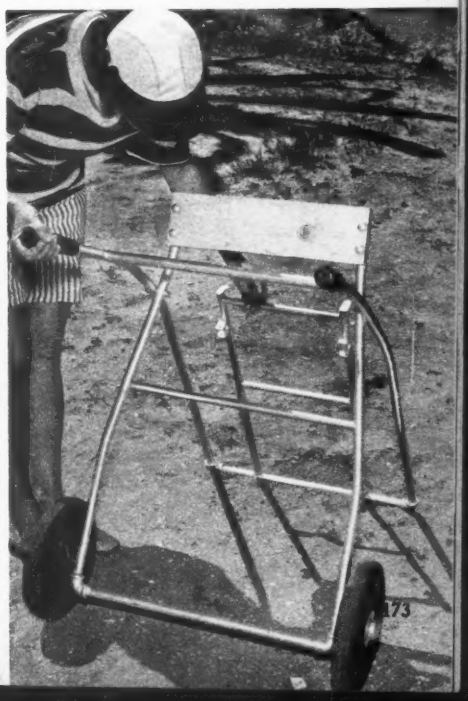
Used Pipe: ¾" dia., 20'
Electrical Conduit: ½" dia., 9'
Bolts: 4, ½"x2"
2, ⅜"x3"
Strap Iron: ⅛"x1", 5" long
Pipe Elbows: 4, ¾" I.D.
Axles: 2 long bolts (or a steel rod) at least ½" dia.
Plywood: 1 piece, ¾"x5"x18"
1 piece, ¾"x5"x16½"
Wheels, 10" dia.; hub caps; grips



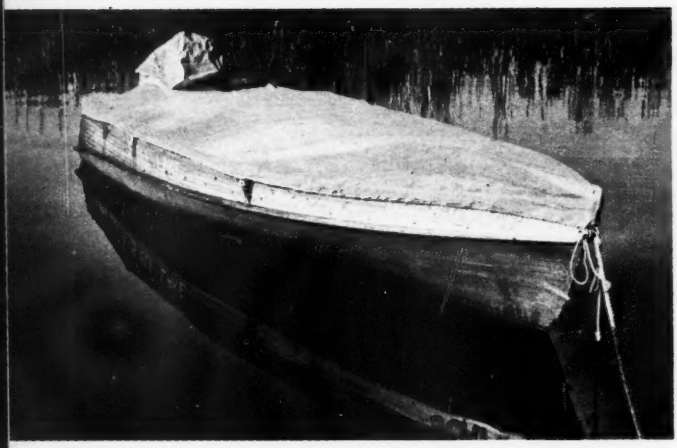


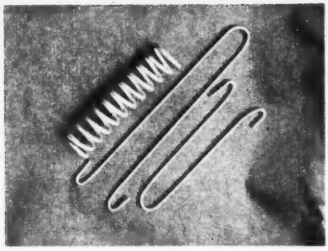
Cart is tilted up to show how single cotter pin (through U bracket) locks platform to bottom rear crosspiece.

Remove cotter pin, lift platform and swing sections together to fold cart. Pin is replaced at center crosspiece.



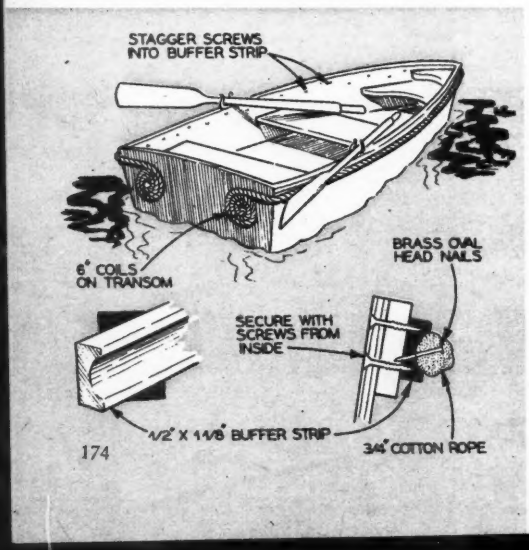
BOATING KINKS



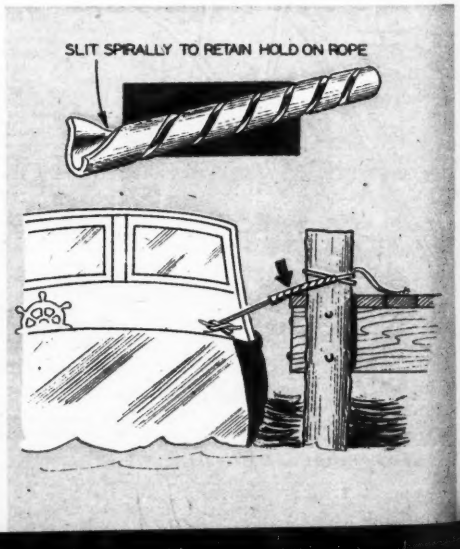


You can keep your canvas boat cover snug with this simple gadget made out of a strong compression spring and two pieces of wire or bronze welding rod as shown in photo left.

A rope buffer on your dinghy will protect the paint of your sloop or cruiser. Rope should be stretched prior to attaching it.

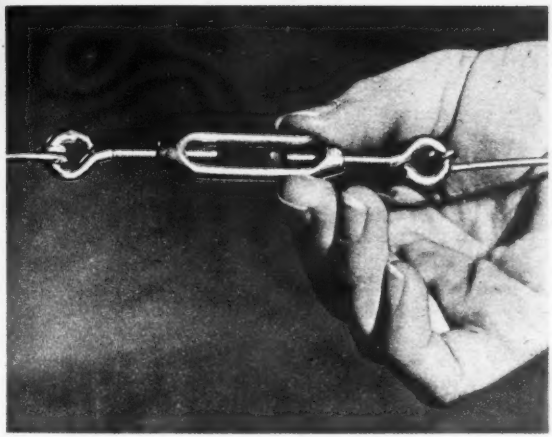


Ordinary garden hose, 12 to 18 inches long, and split spiral fashion can be slipped over mooring line to make a good chafing gear.



HOME HINTS

Protect lawns and floral borders with strips of Scotchlite. The tape is inconspicuous by day, but gleams brightly after dark when struck by headlights of an approaching car.



You can quickly repair or tighten a broken fence wire strand by using an ordinary turnbuckle to splice broken ends together. Photo shows proper attachment procedure.

Sturdy shelf supports can be made from steel corner braces. Place end of brace in vise and bend projecting part at right angles.

A flattened-out lipstick cap placed over the sharp end of a curtain rod will prevent curtain from catching while threading it.

FLASHING FOR EFFECT

You can add dramatic effects to your enlargements, even retouch, with the help of this simple gimmick.

Unsightly telegraph wires can be removed by fogging, as shown on photo at top of page.

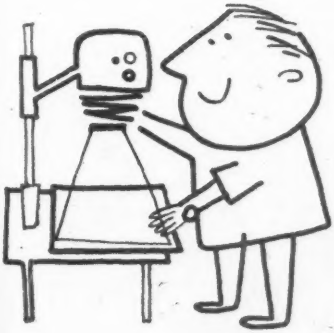
A SIMPLE flashing device, like the pencil light shown at right, or any small flashlight, will help you to turn out professional looking photographic enlargements.

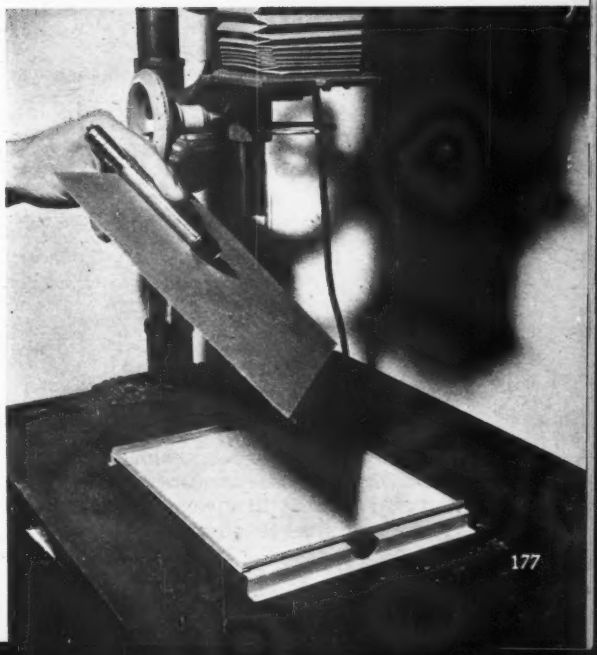
By "fogging" portions of the paper with white light, the sky or other areas can be darkened to give a filter effect, without producing the coarse grain which results from printing through a negative. Besides darkening corners and edges, flashing can eliminate distracting or out of focus portions of the photo and enrich blacks for greater tonal scale and better contrast.—*R. Welch* •

To eliminate hot spots, bulb is dipped in white paint. The translucent head is taped so that light is directional for easy control.

Tape should be slit as shown. It can then be pressed around bulb cover for tight fit. Properly applied, you'll get a soft beam.

Use a piece of cardboard in combination with the flashlight. Always hold light at a uniform height during whole operation.

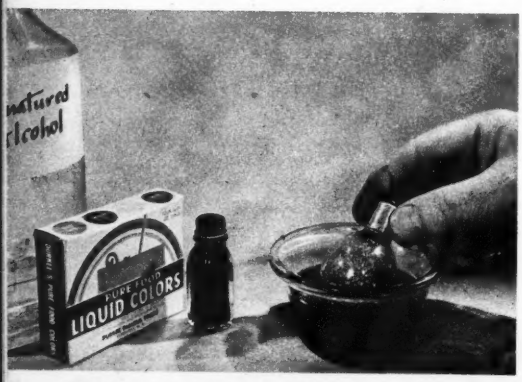




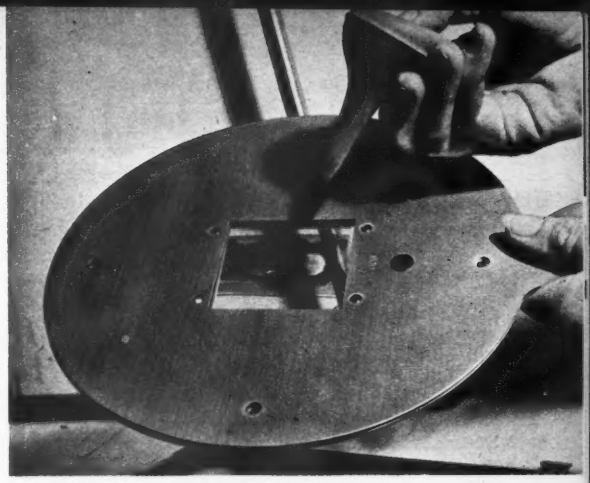
Make ink drawings from a photo by tracing image in India ink. Use an ordinary writing pen or fine drafting pens. Shade by varying weight or number of lines, or with crosshatch pattern. Swab drawing with solution of potassium ferricyanide (two tablespoons to quart of water) until image disappears; fix in hypo.

PHOTO TIPS

Anti-kink device made of plastic-covered wire (the type employed on a telephone) is used to keep cable from electronic flash. Cable can be stretched for arm-length extension.



Tint flash bulbs with blue food color for making daylight color film exposures. Mix with denatured alcohol to give required tint. The plastic jacket absorbs color.



Clean negatives with small air bulb or syringe. Forced air will blow the loose particles off cleanly. Stubborn particles can be removed by holding the bulb very close to the surface of the negative and using the suction.

Can film washer does better job. After developing in the regular tank, switch reel to a clean can with small holes drilled in the bottom. Washing is completed faster and more efficiently since heavy hypo isn't trapped at bottom.

Base of flash bulb should be cleaned of dirt or corrosion so that good electrical contact exists between bulb and flash gun. A piece of emery cloth mounted on the back of the reflector with some rubber cement is always handy.

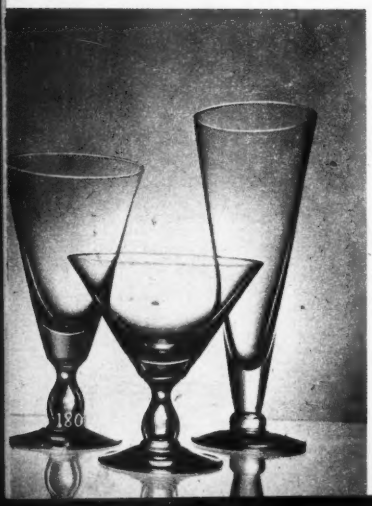
MONTHLY PHOTO CONTEST

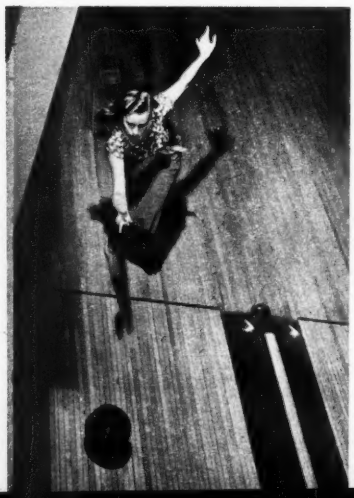
SUNDOWN wins the first prize ($10) for Yook O. Hom of N. Y. The camera was a Leica with a 50mm lens. Setting was f-5.6 at 1/100th sec.; Kodak Plus X film.

Please put your name, address and picture-taking data on back of each print. Wrap with cardboard stiffeners and enclose a self-addressed stamped envelope or postage for return of unused photos. Prize-winning pictures are not returned. Judges are MI Editors. Duplicate prizes awarded in case of tie. Please address your entries to: Photo Contest, *Mechanix Illustrated*, 67 W. 44th St., N.Y.C. 36

COMPOSITION by John Hodges, Hartselle, Alabama, wins $5. Taken with a Graphic on a dull day; f-32 at 1/5th; Royal Pan film.

GLASSWARE wins $5 for Arthur Lundy, San Jose, California. Kodak Reflex II; 1/10th at f-5.6; Plus X; No. 2 Photoflood behind.



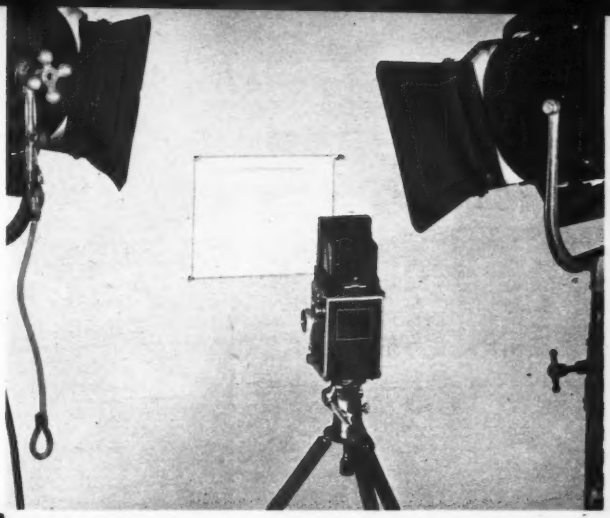


BETTY BOWLING is $5 winner for Joseph I. Kurasch of New York. Graphic set at f-11 for two speedlights. Superpan Supreme film was used.

DOCUMENT COPYING

Get better results by using a sheet film in your roll film camera.

By Kenneth Elliot



Set lights at 45°. Center taking lens on page.

Cut film to size and place in camera as shown. Film pressure plate holds it in proper plane.

HAVE muddy prints been the result of your attempt to copy important papers with your roll film camera? Then you should try commercial copy film to get professional results.

To make good copy negatives use Ansco Reprolith Ortho Type B or Eastman Contrast Process Ortho film. These films have high resolving power, excellent contrast and can be handled under a red safelight.

The film is cut to fit the size of the inside back of your camera. When put into the camera, it is held in the proper plane by the film pressure plate. Exposure is made in the usual manner with one light on each side of the camera. Pay particular attention to the manufacturer's film speed rating and the light meter reading. If necessary, a portrait lens can be used to get a larger image. Slight underexposure and overdevelopment will increase the contrast. •

Aircraft Industry						
Beech Aircraft CCC	($ 1)	599,865	0.75	1.25		26
Bell Aircraft B	($ 1)	1,290,230	1 00	1.25	26	25
Boeing Airplanc B	($ 5)	3,246,436	1.75	2.00	79⅞	75
Chance Vought Aircraft X	($ 1)	1,079,619	—	0.80	35½	38⅜
Curtiss-Wright CCC	($ 1)	6,985,387	0.60	1.00	18¾	18⅝
Douglas Aircraft BB	(no par)	2,459,860	3.25	6.50	137⅝	130¼
Fairchild Engine & Airplane CC	($ 1)	2,887,758	0.80	0.80	17½	18¼
General Dynamics B	($ 3)	2,182,000	2.25	3.25	91⅝	82¼
Grumman Aircraft Engineering B	($ 1)	2,000,000	2.00	2.00	40	39⅝
Lockheed Aircraft B	($ 1)	2,684,753	1.62½	2.85	58¾	51⅝
Glenn L. Martin CC	($ 1)	2,270,967	—	0.91	38⅝	32½

A reproduction of a documenf copied with sheet film.

The Amateur Telescope Maker's Page

Photographing the Moon

Fitting a Rollei Camera at the eyepiece end of an 8-in. reflector made for photo work.

MOST camera fans attempting to take pictures of the moon fail to realize our satellite is also a sunlit object in space. As a result, they overexpose so much that even the earth's rotation has time to elongate and further distort the lunar image. To get a good picture follow the basic exposure directions tabulated at right. Note how similar they are to outdoor shots you would make right here on the earth.

If you use Eastman Plus-X or Ansco Supreme film, shoot at 1/50th of a second and the following diaphragm openings:

Crescent	**f/5.6**
Quarter or half	**f/8**
Three-quarter	**f/11**
Full	**f/16**

Magnification is necessary, and the information given applies whether you use a movie or still camera with its own telephoto equipment, or attach the camera (with [*Continued on page* 222]

Photo below was taken at 1/50th and f-8.

Full moon taken at f-16; Plus-X roll film.

Photos by Frank Henrich

WEEKEND PROJECT

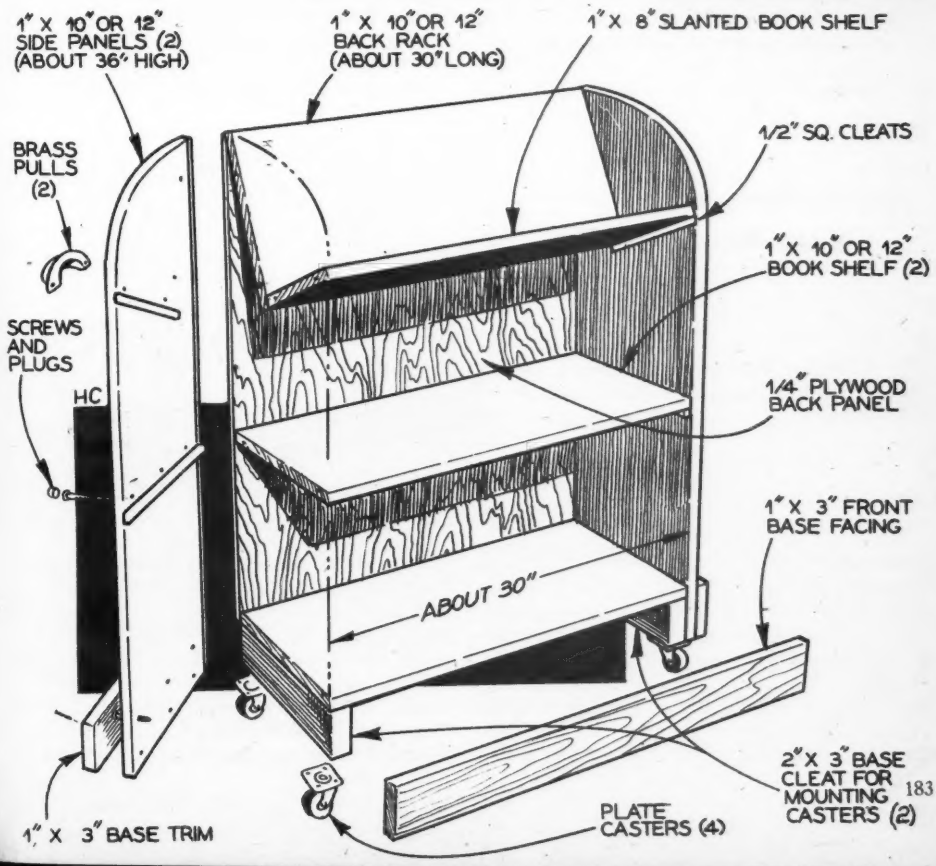
ROLLING BOOKCASE

THE main reason for having the top shelf of this "portable" bookcase at a slant is its better accessability and better angle when working and writing in bed. The lower shelves are intended mainly for manuscripts and papers, although they may, of course, also be used for storage of books.

The comparatively small weight of the unit, plus the swivel casters, make it an easy job to wheel it outside on the terrace, garden, or anywhere else around the house whenever reference books are required.

The type of lumber used in construction will depend on the desired appearance, as well as on the expense you are willing to go to. The shelves are supported by ½-inch square cleats, glued and nailed to the side panels. Two brass pulls mounted at a convenient height will easily move the bookcase. Finish with stain and two coats of lacquer. •

—Mildred Wood Perkins



NEW DO-IT-YOURSELF KITS

Develop your own negatives . . .

Print your own snapshots . . .

. . . and do it the easy way with a Kodak Photo-Hobby Outfit

It's a thrill to watch a blank sheet of paper change into a familiar snapshot scene right before your eyes. And with a Kodak Photo-Hobby Outfit that thrill can be *yours*.

If you're a beginner—you'll like the simple, compact, "no-fuss" versatility of the new do-it-yourself Photo-Hobby Outfits. With Velite Printing Paper, for instance, you don't even turn off the room lights in order to print sparkling snapshots. Just subdue the brightest lights, add water to three chemicals, and start printing. To develop negatives you darken a room long enough to place a roll of exposed film in the developing tank, then switch on the lights. The chemicals do the rest.

If you're an experienced amateur—a Photo-Hobby Outfit can be a handy time-saver for making your "proofs." As for the extra pictures other members of the family want, here's a thought: With a Photo-Hobby Outfit, they can print their own snapshots and photo-greeting cards. Best of all, they'll enjoy doing it!

Now—read the details below.

New Kodak De Luxe Photo-Hobby Outfit

$16.95

Similar Outfit with Printing Frame Instead of Photo-Hobby Printer

$9.95

Here's what you get in this outfit—1. A Kodak Photo-Hobby Printer, Model A, with a built-in lamp socket (takes a 60-watt lamp for Velite Paper, or 15-watt lamps for other Kodak contact-printing papers); a hinged platen, red safety light, switch for controlling exposure time. 2. Kodacraft Printing Mask Set with openings to fit all popular-sized negatives. 3. Kodacraft Roll-Film Tank with two aprons for 127 and 620-120 film sizes. 4. 16 ozs. liquid Kodak Versatol Developer. 5. 16 ozs. Kodafix Solution. 6. Six 8-oz. packets of Kodak Universal Stop Bath. 7. 100-sheet package of 2½" x 3½" Kodak Velite Paper. 8. 4-oz. plastic measuring cup. 9. Three 5" x 7" Tenite Rocker Trays. 10. Kodak Glass Stirring Rod. 11. Kodak Darkroom Thermometer. 12. 2 Plastic Film Clips. 13. Blotter Book for drying prints. 14. Viscose Sponge. Also, Simplified Instruction Card.

New Photo-Hobby Outfits feature "Do-It-Yourself" Instruction Cards

Packed with each of the two outfits described on the previous page is a big 11 x 14-inch card. On one side are simple 1-2-3 instructions for *developing* negatives . . . the other side for *printing*. You can't miss. It's the easiest-to-follow guide you've ever seen.

P. S. for Christmas—Either one of the new Kodak Outfits makes a wonderful gift for snapshot fans of any age. Want one for yourself? Drop a hint in the right place—now! Want one for someone else? You'll be making someone very happy!

When you need more Photo-Hobby Outfit materials . . .

Next time you visit your photo dealer, ask him to show you the Kodak chemicals that have been prepared for do-it-yourself hobbyists. Some of them come in ready-mixed liquid form. Others are in handy foil packets—you simply mix the powder with water and it's ready for use. Here are several chemicals particularly suitable for home use. (The first two are Photo-Hobby Outfit liquid chemicals you'll want to replace, along with Velite Printing Paper, before your original supply runs out.)

Kodak Versatol Developer—An economical "all-purpose" developer. Dilute 1:7 (1 part developer to 7 parts water) for developing negatives in a tank. For clear, sparkling prints, dilute 1:3. 8-oz. bottle, $.35. Quart, $1.

Kodafix Solution—A concentrated hardening-fixing bath which makes the images permanent on film and paper. Requires only the addition of water to prepare it for use. Quart bottle (to make 1 gallon), $1.

Kodak Microdol Liquid Developer—For even finer-grain negatives (hence finer-grained prints) than an all-purpose developer can provide, use Microdol for developing your *negatives*, and Versatol (see above) for developing your snapshot *prints*. Microdol comes ready for use without dilution. 1 quart, $1.

Kodak Rapid Selenium Toner—Usable at various dilutions to give your snapshot images permanent cold-brown tones. 8-oz. bottle, $1.05.

Kodak Brown Toner—Dilutes 1:32 to give snapshot images warm-brown tones. 8-oz. bottle, $.90.

Kodak Photo-Flo Solution—Highly concentrated wetting agent that lets water run off film and paper surfaces without leaving water marks and streaks. Note to 35mm users: As you may know, 35mm film differs from paper-backed roll film in that it has gelatin on one side and a plastic base on the reverse (instead of gelatin on both sides). Kodak Photo-Flo does a remarkable job in wetting *both* the plastic base and gelatin surface to let the water run off without leaving streaks or spots. No need to even sponge the film. 4-oz. bottle (to make 6 gallons), $.45; 16-oz. bottle (to make 24 gallons), $.90.

Ask to see the handy foil packets of Kodak chemicals, too.

Prices are list, include Federal Tax where applicable, and are subject to change without notice.

Kodak
TRADE-MARK

Eastman Kodak Company
Rochester 4, N. Y.

You need fewer tools when you use...

CHAN NEL LOCK pliers

here's why

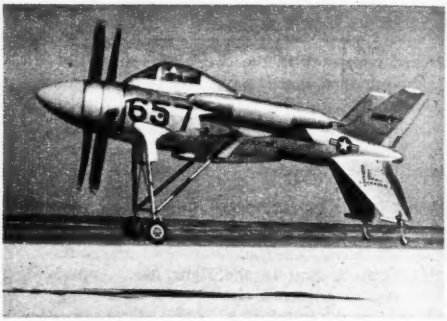
Look for the Channellock line when you're shopping for hand tools. Channellock pliers offer features that you can't get with other makes. And when you buy a Channellock plier, ask to see the full line — you'll find a style and model to do any job better.

THE PLIER DESIGN THAT OBSOLETES ALL OTHERS

CHAMPION DeARMENT TOOL CO. • MEADVILLE, PA.

VTO

[*Continued from page* 136]



Lockheed's VTO ship shown with conventional landing gear during early test operations.

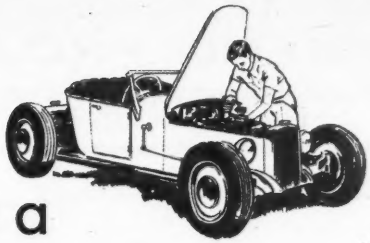
ings and scale details along with the scale prop and spinner. These added features are used for display purposes only, and are removed for flight. The material used can be most any quality of balsa, finished accordingly.

The wing tip tanks have a touch of simplicity. A sheet of $\frac{1}{16}$x3 in. is water-soaked and wrapped around a ⅞ in. dia. mandrel. When dry, cement the seam and fasten both the forward and aft blocks. Process these details in a manner similar to the sheeted areas on the main assembly, using clear and colored dopes.

While finishing bear in mind that a minimum of weight is our working goal, so spray or brush on the silver pigments, using but one thin coat. The red is brushed on as indicated, first masking off the necessary areas. Having allowed sufficient drying time (about three hours) the balance of trim can be added. The drawings show the proper decal in its proper place. The surface trim lines are either inked or decaled in place, using black Trim-Film.

Having completed this detail work, apply a coat of Comet fuel proofer to all surfaces, also a drop of oil to the spindle for free movement. The final stage of construction is limited to the .035 in. sheet aluminum, contra-rotating prop which mounts on the engine crankcase. You will note that the props rotate in opposite directions permitting vertical flight. Be certain to bend the proper pitch into the alu-

[*Continued on page* 190]



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15	16	17	18	19	20	21
22	23	24	25	26	27	28

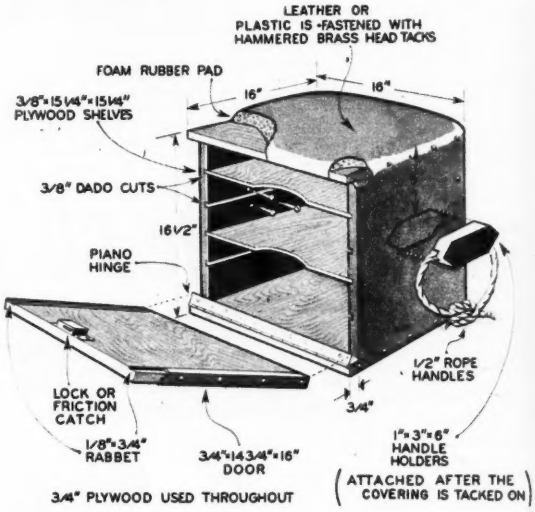
WEEKEND PROJECT

STORAGE HASSOCK

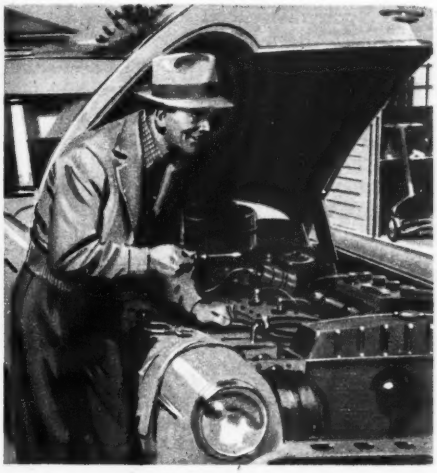
STURDY in construction and unusual in appearance, this hassock will answer all the demands of functional furniture. Besides being used as a seat or footstool, the hassock doubles as a storage unit for records, magazines, etc.

The simple wooden frame construction is completely covered with colored plastic cloth. A piano hinge fastens the door to the framework. The foam rubber pad, obtainable at any five-and-dime store, is placed on top of the hassock and plastic cloth tacked all around it. Upholsterers' tacks are used to attach the plastic. The two wooden handles are stained, sealed with shellac and varnished.

To keep the rope ends from unraveling, they should be wrapped with thread, harmonizing with the color of the plastic.—*M. Grassell* •



Texaco Tips On Car Care



← Safety check your heater hose connections

If the rubber tubing between your heater and motor block is weak, it may break and splash your engine with the coolant and anti-freeze. Carefully inspect these hose connections. Interior linings on hoses three or four years old may have separated and the entire connection should be replaced. You'll find your heater will work better, too. Your nearby Texaco Dealer has a stock of new tubing on hand.

Safeguard your chassis with proper lubrication

Marfak chassis lubrication protects your car against winter weather. It's tough and stretchy . . . clings tightly to points of wear and friction . . . won't squeeze out, jar out or wash out. So you get smooth, *cushiony* motoring for 1,000 miles or more. And remember — your car is lubricated by chart, not by chance. Today, drive in for longer lasting *Marfak* chassis lubrication. See your Texaco Dealer, *the best friend your car has ever had.*

MARFAK Lubrication

TEXACO

TEXACO DEALERS IN ALL 48 STATES

Texaco Products are also distributed in Canada and in Latin America

THE TEXAS COMPANY

TUNE IN: TEXACO STAR THEATER starring JIMMY DURANTE, on TV Saturday nights, NBC.

*Multi-Motion

**Almost all wood grain is naturally crooked, irregular. Only Syncro exclusive "Multi-Motion" sanding pad action, can sand with such grain and completely finish the whole surface. AND—built-in Syncro motors are guaranteed against burn-out all during your ownership!*

No. 900
HEAVY DUTY SANDER

Outlasts, outsands all other portables! No "jumping". So easy to use with exclusive "Multi-Motion" action!

Sanders

SANDING HANDBOOK, CATALOG FREE!

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AMERICA'S FINEST FINISH SANDER

Light, powerful. Easiest for vertical use. In metal case, sandpapers, polish pad.

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DELUXE HEAVY DUTY SANDER KIT

The ultimate in sanding! Kit contains sander with work light, metal case, 48 assorted sandpapers, polish pad.

SYNCRO CORP.,
Dept. 3-85, OXFORD, MICH.

By SYNCRO
MULTI-MOTION SANDER

VTO

[*Continued from page* 186]

minum blades permitting the required lift.

Prior to flight, test the engine. Lubricate the moving parts to avoid any danger of binding. Place the fuel lines in such a manner that centrifugal force will not bleed the tank. Our next step is actual flight.

The hook fastened to the tail block is used for a tethered launch. Fasten a string to the hook with the other end fastened to a weight. With the engine running and the model tethered vertically in the air the line is severed at the crucial moment—and away we go. However, a hand launch is most appropriate since it is the quickest method of launching. In closing we would like to mention a simple fact, the above design is a new approach to model aviation. Our main purpose was to get it off the ground vertically and have it return in one piece. This, with care, the model will do.—*Paul J. Palanek* •

BILL OF MATERIAL

(balsa unless otherwise specified)

20 pcs. 1/16"x1/8"x36"	Med. grade	Wing spars, fuselage stringers
1 pc. 1/8" sq. x 36"	Med. grade	Wing leading edge
4 pcs. 1/32"x2"x36"	Med. grade	Wing skin and tip covering, tip tank wrap
3 pcs. 1/16"x2"x36"	Med. grade	Wing ribs, fuselage formers, gussets
4 pcs. 1/16"x3"x36"	Med. grade	Fuselage crutch, rudder sheet lay up, scoops
1 pc. 1/8"x1/2"x36"	Med. grade	Pre-shaped wing trailing edge
1 pc. 2"x2"x4"	Med. grade	Fuselage nose bearing block
1 pc. 1"x1"x18"	Med. grade	Wing tip tank tail and nose blocks, fuselage tail block
1 pc. 4 1/2"x4 1/2"x4 1/2"	Med. grade	Dummy nose spinner block
1 pc. 1/16"x1"x36"	Med. grade	Dummy prop blanks
1 pc. 1/8"x2"x2"	Plywood sheet	Engine spacing mount
1 pc. 1/4"x1/4"x36"	Med. grade	Tail shock mounts

Miscellaneous Items

.074 cu. in. engine; medium grade Silk-Span covering; clear and colored dopes; Comet fuel proofer; cement; plastic fuel lines; .035 24S-T aluminum contra prop; bubble canopy; 6-5 engine prop; 4-40 nuts and bolts to fasten engine; stars and bars, and lettering decals; 1/4" O.D. brass tubing; 5/16 in. O.D. brass tubing; .032 in. sheet brass; wire hook for flight release during tethering launch.

Golden Hammer Awards

[*Continued from page* 153]

Michael Seib, Jr., Trenton, N. J. . . . Archie Vann, La Jolla, Cal. . . . Paul Martina, Middletown, Ohio. . . . H. O. Wilson, Luthersville, Ga. . . . C. F. Belew, Fairhope, Ala. . . . D. Campbell, London, England. . . . R. W. Morledge, Alliance, Ohio. . . . Ray Gruver, Havelock, Iowa.

[*Continued on page* 222]

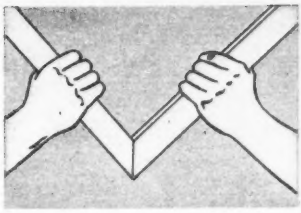
NOW! Put up Plywood Panels *Without Nails!*

It's a revolutionary construction technique! Made possible by a new adhesive...Weldwood Contact Cement! Lets you put up plywood with ease. Ends nail-setting and puttying. No finishing unsightly nailholes. You install the plywood panels directly to studs or furring strips. Makes prefinished plywood paneling more practical than ever before!

Weldwood Contact Cement bonds instantly without clamps or presses. 1001 uses in every home, shop, garage. For bonding wood, aluminum and other metals, cloth, felt, paper, leather, fiberglas, rubber. Wonderful for applying Micarta — without clamps or presses.

NOW! A Special Weldwood® Glue for Hobbyists!

It's ready-to-use! It sets fast! It bonds like magic! It's Weldwood Presto-Set Glue! The first white glue worthy of the Weldwood name. Just brush or swab on. Bonds wood to wood ...wood to cloth...cloth to paper...upholstery fabrics to wood...leather to leather...many other uses. Jobs can often be worked in 20 minutes after gluing. It forms a bond that *stays* strong. See how it speeds things around your workshop . . . see how it handles toughest jobs like magic!



Makes Glued Joints even Stronger than Wood!

When your job demands professional results . . . or where water-resistance is important . . . use the glue that professional cabinetmakers love to use . . . Weldwood Plastic Resin Glue. It's just about the best wood glue there is! Actually makes glued joints stronger than the wood itself! Grows even stronger with age. Highly water-resistant, stain and rot-proof. Spreads smoothly and easily. A little goes a long way. Where quality counts most, there's no substitute for Weldwood Plastic Resin Glue — deservedly America's largest selling wood glue.

Weldwood Glues — First Choice of Professionals!

Industri[illegible] woodworkers, builders and professio[illegible] cabin[illegible] know their [illegible] stake, every [illegible] them, only t[illegible] and the be[illegible] ood Gl[illegible]s. [illegible]ros" wi[illegible] the W[illegible] the [illegible]ons of [illegible]ich inst[illegible]me! Weldw[illegible] har[illegible] every [illegible] builders [illegible] makers [illegible] are a[illegible] job. So fo[illegible] good enough [illegible] best i[illegible]

Weldwood® Glues . . . Satinlac® Firzite® are available at all hardware, lumber and paint dealers.

Make Inexpensive Plywood Look Rich and Costly!

Here's the easy way to "tame wild grain" on fir plywood stain jobs . . . and get the appearance of expensive woods. Start with a base coat of *Clear* Firzite®! Subdues wavy grain. Helps end grain raise and checking. For oak, walnut, or mahogany stains, add colors-in-oil.

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Blond, pickled or wiped effects are really popular. Get them easily on any kind of wood, without a "painty" or artificial look — with *White* Firzite. It brings out the handsome "woodsy" quality. For tinted effects add colors-in-oil. (On soft wood or fir plywood paint jobs, *White* Firzite as an undercoater helps prevent grain raise and checking.)

Quick Way to Accent Natural Beauty of all Woods!

Apply Satinlac® for a rich satiny effect which wears well and is easily maintained. The full beauty of the wood grain is accentuated and protected! Won't discolor with age. Dries so quickly, it's ready for the next coat in 3 or 4 hours.

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A 30 h.p. Alternate Four, weighing only 110 lbs.... the exclusive Mercury carrying handles actually make it seem lighter... available with 12-volt electric starter and generator... all the quality Mercury features.

Proved by years of brutal field testing, backed by experience only Mercury has from building more than two million horsepower of famous 4 cylinder Thunderbolt engines! The finest, smoothest, most powerful engine in its class... fully qualified to wear the Mercury trade mark.

6½ gal. remote fuel tank standard equipment

MERCURY ... *THE MOST POWERFUL NAME IN OUTBOARDS*

REMEMBER ... *A FOUR IS BOUND TO BE BETTER*

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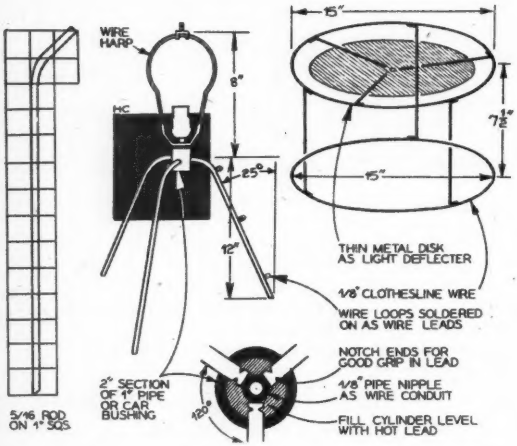
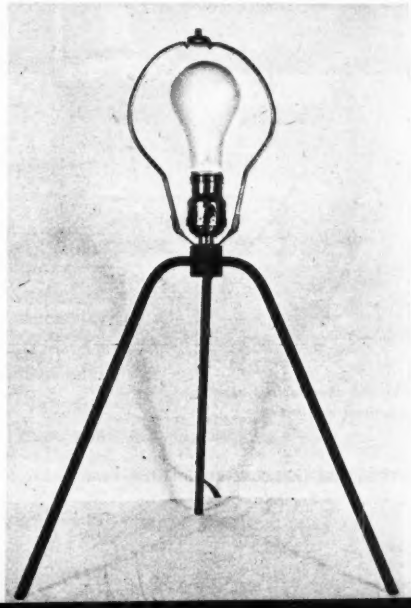
WEEKEND PROJECT

WROUGHT IRON LAMP

NEED another table lamp? Here's one that's attractive and easy to make. Legs are 5/16-in. wrought iron rods cut and bent as shown. A notch is cut at the top of each and three loops are soldered on one leg for wire leads. Center section is a 1-in. pipe or bushing 2 in. in length. Three 5/16-in. holes are drilled 120° apart on the circumference and the legs are pushed in to hold the nipple used as a wire conduit. Use a clamp and a piece of scrap metal to cover the bottom of the center section, line up the legs, preheat the cylinder with a blowtorch and fill with lead. Then drill a hole through to the center and next to the leg with the guides to pull the cord through. Attach the harp and socket to the pipe nipple. Use pencil erasers for leg tips or drill holes for rubber cushions.

All joints on the shade frame must be hard soldered or brazed. The sheet metal plate on the top cuts out the glare and makes the frame rigid. The cover may be of parchment or plastic cut to size and punched for lacing. •





Right: Completed lamp stands ready for shade. Wire through loops on leg isn't too obvious.

Tom McCahill makes anti-freeze test run...

"My test run through Death Valley to Pikes Peak proves

'ZERONE'—DU PONT'S ECONOMY ANTI-FREEZE—WON'T BOIL AWAY!"

"This summer I drove through the blistering heat of Death Valley to the snow-covered top of Pikes Peak, 1300 miles away. I wanted to see what 'Zerone'—an *economy anti-freeze*—would do in a modern, pressurized cooling system when the going got really tough.

"I had enough 'Zerone' in the radiator to protect to 10° below zero. A flask was attached to the overflow pipe to catch any solution that might boil over, and the radiator was officially sealed.

"My route took me up mountains, through heavy traffic, bad weather, changing temperatures—a grueling test for any anti-freeze.

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MAIL FOR McCAHILL

Uncle Tom is sorry he can't answer all his mail personally. In this column he'll answer the most interesting letters. Write to him at MECHANIX ILLUSTRATED, 67 West 44 St., New York 36, N. Y.

● *From your pictures, and reading your stuff for years, I'll bet that you're a pretty good card player. Do you have any system for winning at poker?*

Charlie Randolph
Richmond, Va.

The best in the world. Cheat.

● *I see that they are now going to build Volkswagens in the old Studebaker plant in New Jersey. This should make them a lot cheaper, so would you advise I wait and buy an American Volkswagen?*

Grace Somers
Newark, N. J.

No. I don't believe they'll be any cheaper. And as at least 90 per cent of a Volkswagen's worth is in the workmanship, I'd advise buying one right now, while they are still being imported. Please don't misconstrue this to mean that I don't think Americans are capable of quality workmanship—they definitely are—but under the current automotive workers' set-up in this country, the trend is for less hours, less work and more benefits, etc., which is great and I'm all for it if they'd include quality of workmanship, which is never mentioned in American labor contracts.

● *I find the wraparound windshield in my Chrysler extremely hard to defrost and de-fog. Is this a fault of the windshield or the defrosting mechanism?*

George Brokaw
Buffalo, N. Y.

The windshield. The wraparound feature affects the clear-away draft of the vent windows, which formerly were an aid in keeping windshields un-fogged. For my dough, the current goldfish windshields are a mess and create much more dangerous situations than the older type with less glass area but more efficiency. Who'd stand for distortion in the windshield of a $5,000 car three years ago? Today you'll take it and like it—or leave it. On long trips this is extremely tiring to the eyes. Tie this up with several ridiculously deep-toned tints, and you're well on your way toward going blind.

● *Why do all manufacturers make heaters optional? All cars need heaters; why not make them standard?*

Ben Hoffritz
Boston, Mass.

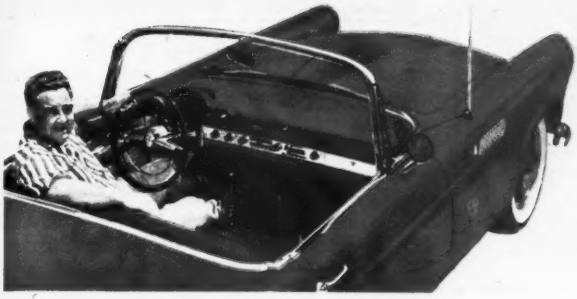
Believe it or not, some guys live in Panama, Key West, and even the southern part of Texas. If you lived in one of the real hot climates and were forced to take a heater, you'd feel like a glamor girl who was forced to take a can of Copenhagen snuff every time she bought a lipstick.

● *On your advice I bought a Lincoln in 1953 because I wanted a great road car. I've driven it over 70,000 miles but don't feel it has the roadability it did when it was new. Is this possible or is it my imagination?*

Wade Kulp
Dallas, Texas

It is not only possible but probable. With use, shocks wear out and lose their fight, coil and leaf springs get resistance-flabby, and even tires after a few thousand miles get a certain sidewall sponginess and have more of a tendency to roll under. Any top-flight road car will lose much of its road-

[*Continued on page* 211]



Graceful Nancy Cooper thrills crowds at the Cypress Gardens' water skiing show.

Dick Pope

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Miniature Gas Engine

[*Continued from page* 130]

crankcase and cooling fins. However, substituting aluminum should make the task of machining simpler.

The crankcase is machined from one piece with the three mounting pads soldered in the position shown. A roller bearing is press-fitted in the crankcase and rear cover. Thread the rear cover and tap the crankcase. Machining the crankshaft is accomplished in several operations. The bearing ends are machined first. Constructing the shaft as designed eliminates the need of balancing. The completed unit can now be installed and checked for alignment.

The cylinders are cast iron and are machined from one piece. The O.D. is threaded and the I.D. is lapped to the tolerance given. The cylinder head plug is fastened to the cylinder with a light press fit and solder. Cut out the exhaust and bypass ports as indicated and install with solder.

With the wrist pin, piston and connecting rods completed, assemble all three to the crankshaft and to themselves. The Oilite bushing is press-fitted into the rod and the pin is fitted into the piston, pivoting in the bushing. Install the brass keepers to prevent scoring of the cylinder walls.

Use aluminum or brass for the cooling fins. A pair of Champion V-3 Glo plugs are fastened to the cylinder heads. This split setup of cylinder and fins make a unique and simple arrangement.

The heavy duty fly wheel and spinner is machined from brass. A V groove permits a wrap of thread to form the lanyard for starting. Press-fitted into the fly wheel is the eccentric cam; a .100 cam rise is employed. The internal taper of the cam matches that of the crankshaft. Assemble the unit on the crankshaft and secure with the spinner.

The needle valve body is machined using brass or aluminum. Through the center of the body drill and tap to receive the needle valve and needle valve seat. Both are machined from brass. This entire assembly is mounted to the side of the valve lifter guide as indicated. Fabricating the valve stem, body and rocker is comparatively simple. Steel is used throughout and held closely

[*Continued on page* 200]

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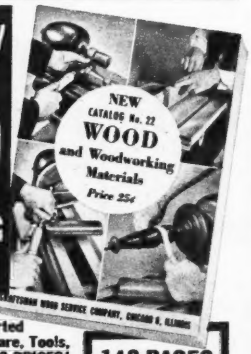

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Miniature Gas Engine

[*Continued from page* 198]

to the dimensions given. A spring is employed to return the valve to the closed position. The push rod is fitted with an adjustable pad which is soldered after running adjustments are made. Fasten the valve body to the crankcase pad, then the rocker and spring and lock collar, all in proper order.

Placing the tank with its complement of good quality Glo fuel aft, you are all set up for running. Timing the engine is left to the builder. Due to individual machining the variations in timing may be considerable in different engines. Since the two-cycle principle is employed, timing will be simple; just turn the cam until the proper power combination is achieved.

To start engine, get two dry cell batteries, one for each plug. The + lead is hooked up to one plug, the — lead is grounded to the cooling fin. Duplicate this arrangement for the other plug. Employ a lanyard wrapped several times in the grooved fly wheel for easy starting. •

The Radial Arm Saw

[*Continued from page* 124]

position and the work is pushed through. It's also possible to turn the blade, so that ripping may be done from either side of the saw.

It's easy to grasp the principles of the radial arm saw if you think of it as the "3-D Power Tool." First of all, the arm, from which the motor and blade are suspended, may be turned from side to side—you position the arm to make miter cuts.

Second, the motor yoke, slung under the arm, may also be swiveled. You switch it around, at right angles for ripping and rabbeting. Third, the motor itself, to which the blade is attached, may be tilted to make unlimited bevel cuts.

The De Walt and Delta people say that they have achieved maximum flexibility for their saws by making it possible for all of the above adjustments to be carried out through a full 360° circle.

Oversize knobs and latches (there are about half-a-dozen on the average machine) are used to make adjustments on

[*Continued on page* 202]

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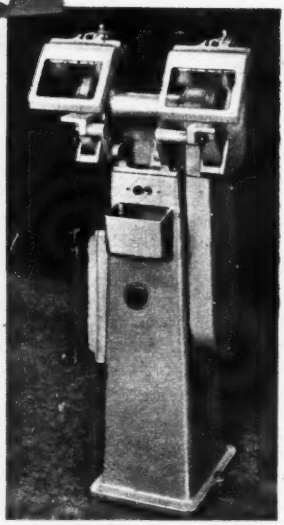

Ruggedly built for long, hard use on production, maintenance or toolroom work. It features motor mounted in pedestal, V-belt drive to ball-bearing spindle, no wheel load on motor bearings, less vibration, two lights per shield, adjustable tool rests and adjustable spark guards.

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SPECIFICATIONS— Wheels: 8" (½ h.p. motor), 10" (¾ h.p. motor). Spindle Speed: 2450 r.p.m. (approx.). Size: 49½" x 18½" x 20½".

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The Radial Arm Saw

[*Continued from page* 200]

the radial arm saw. Calibrated rip, miter and bevel scales are mounted on the machine to guide you in all your work—you simply dial the angle of your cut. There are click stops that automatically select the correct settings for the commonly used 0, 45 and 90° positions. The controls lock and hold the various parts precisely in place.

A crank raises or lowers the arm to adjust the blade for cutting various thicknesses of wood. On the De Walt saws, one complete turn of the crank raises or lowers the arm an exact one-eighth inch. This saw also has an ignition-type switch that can only be operated with a key.

Here's some operational dope on the radial arm saw. A nine-inch model will cut 2½ in. deep, crosscut 15 in. wide, rip to the center of a 48-in. panel. A 10-in. saw will cut three inches deep, crosscut 16 in. wide, rip to the center of a 52-in. panel. For a four-inch deep cutoff, a 12-in. blade may be used.

And how many cuts can you make with a radial arm saw? A good many—about 20 in fact. Crosscutting, ripping, mitering and beveling are a breeze. Compound miters, more than a little difficult with ordinary saws, are a cinch on the radial arm saw. You angle the arm, tilt the motor and blade, pull the blade through, and presto! Ripping becomes a fine art with the radial arm saw. Bevel ripping and taper ripping are facets of this art, as is wide panel ripping. For wide panel ripping, you move the fence to the rear of the table.

Some of the fancy maneuvers of a radial arm saw are grooving (and of course tongue-and-groove), raised panels, contour cutting, chamfer cut, shadow box cut, diamond shapes, curving wood, and saucer cut. The pictures show many of these operations.

Many common joints may be made on the radial arm saw with cabinetmaker's precision. Among them, the lap joint, lock joint, bevel spline joint, mortise-and-tenon. And it's quite a sight to see the saw doing some horizontal cutting. For this trick, you bring the blade and motor out to the end of the arm, swing them over so

[*Continued on page* 204]

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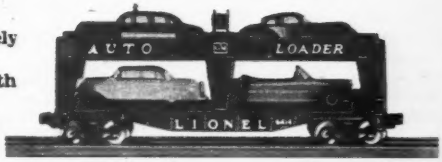

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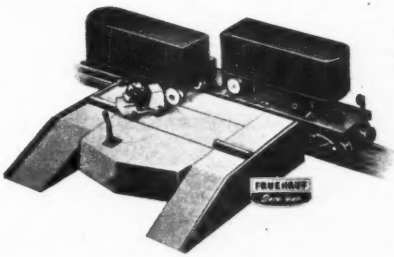

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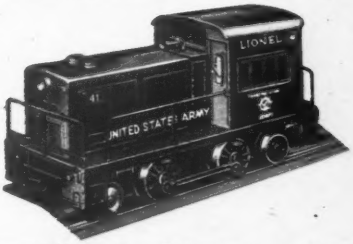

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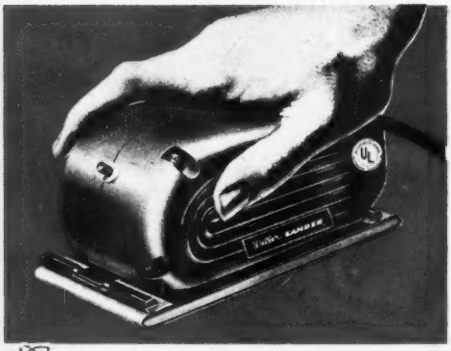

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The Radial Arm Saw

[*Continued from page* 202]

that the teeth of the saw face toward the outside of the bench. Then, you take your plywood panel and set it on a wooden glide on the floor and slide it through the blade, keeping it firmly pressed against the rim of the saw table.

Various kinds of blades are available for the radial arm saw. Commonly used are the hollow ground, combination, rip, hard tip, fine tooth, and metal cutting blades. They range in price from about $3 up. You can get a 10-in. hollow ground miter blade for $10.45.

Naturally, you can put a dado head on a radial arm saw. With the dado head you have a choice of 14 operations. All kinds of cross, angle and parallel dadoes are possible by just pulling the dado back and forth across the work. You can do ploughing, center ploughing and bevel ploughing with the motor locked in rip position.

For center ploughing—making a groove that doesn't reach to the end of the board—use the crank to lower the arm and dado head into the work at the point where you wish to start. After you make a groove of the desired length, just crank the dado out again.

With a dado on your radial arm you can do plain and bevel rabbeting, radius cutting, blind and regular mortising, fluting, double tenoning, scalloping, panel sinking and tongue-and-groove work.

By mounting a saw blade and dado together, you can do two jobs in the one operation. A good 8-in. hollow ground dado head, capable of cutting a groove $\frac{13}{16}$ inch wide, may be bought for $37. A 9-in. "quick-set" dado, on which adjustments may be made without taking the unit from the arbor, is available for $40.

Various knives, shaping heads, jointer heads and cutters can be mounted on the radial arm saw. It is estimated that because of the saw's tilting arbor, the craftsman may get 50 per cent more shapes per cutter. Buffing and grinding wheels are also easily slipped on the saw mandrel.

Numerous attachments for the radial arm saw enable it to perform almost any function a woodworker might desire. Take sanding. There are disk, drum and belt sanders especially made for the saw. With

these units you can do all kinds of sanding —straight edge, surface, bevel, butt and irregular curve. The prices naturally vary. One disk sander attachment may cost $8.70, another $14.95. The latter has a small table. You can get a drum sander for as low as $3.75. A belt sander at $15 is available for one saw.

Boring and drilling are important shop duties, and the radial arm saw can be quickly rigged up for this work, too. With some saws an adaptor is placed on the arbor and boring bits locked in the adaptor.

Another feature is a more conventional drill press attachment, used in an upright position, for $15. With any of these accessories, end, edge, miter, face parallel and radius boring are quickly accomplished.

Special jig or saber saws are also available for mounting on some radial arm saws. There are also lathes made for certain radial arm saws. One model, 37 in. long and with a 12-in. swing, is priced at $55. Pulleys provide a choice of speeds. As if this were not enough, one saw features a four-inch jointer as an accessory.

Too much emphasis cannot be given to the merit of the topside cutting operation of the radial arm saw. With the hand guiding the blade down through the work, it is easier to follow layout marks and the ambush element practically vanishes from power saw work.

Topside cutting is a safety feature that has not been overlooked by such interested parties as the insurance companies. The New Jersey Manufacturers Casualty Insurance Co., of Trenton, has this to say:

"We can now say with confidence, on the basis of accident experience, that these so-called radial saws are much safer than a table saw and they most satisfactorily do all the types of saw work required in a shop."

If the radial arm saw has affected a conservative insurance company this way, it's not hard to realize why so many shop owners are sold on the merits of the radial arm saw—at once so versatile and so safe. •

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Hunting and Fishing

COTTONTAIL, SWAMP, SNOWSHOE AND JACK

By Dale Shaw

MORE people hunt rabbits than any other kind of game in America. Also, more people spend more time *hunting* for rabbits than for any other species of sporting animal—for rabbits are clever and adept at evasion or concealment. In time of peak population, they can be awfully easy, but generally a rabbit gives you a run for your money.

Every part of the U. S. has its rabbits or its hares. From the overgrown pastures of the East to western desert, the cottontail is the most numerous fooler. There he squats, ears laid back, body tucked into concealing contour with the land—at the end of a perfectly confused backtrail, rather self-satisfied as the baffled hounds whizz by.

Skip to the Southland, and there in the fastness of a swamp you find another kind of rabbit, this time frozen motionless high on a dry hassock of grass surrounded by water. His body is wringing wet, for he has been swimming with specially webbed hind feet to kick him through the current. Now he can dry off in peace, while from far away comes the sound of disappointed dogs and tired hunters sloshing after them.

Go to the Northwoods, to a place where day-old snow lies soft in cedar thicket. See the mesh of tracks left there by rabbits that picked up feet and laid them down in violent haste yet without floundering in the snow. There goes one now, ambling amiably, pausing, then scooting miraculously over the surface as if it were hard as rock. With his oddly splayed and furry feet to help him, he'll work a wide circle, returning by habit past the hunter's stand, where he will be blasted, cleaned and eaten later with deep enjoyment. Or if the dog presses him too hard, he may forget to run true to form and light out for the next county.

Go lastly to the wide open spaces of the West, to the home of the huskiest, most magnificent, yet most inedible of all the family, the jackrabbit. Today, if he is to procreate his kind, he must dodge .45 slugs thrown at him from moving cars, by men on horseback, by walking marksmen of traditional Western shooting skill. The jack must even outwit the flashy greyhound, the only dog that can outrun him. Greys have been brought in to create a new and more productive jackrabbit sport, but a dull one compared with the game the Hopi Indians play. On horseback they chase the jack, simply to bring him within throwing range of the crude boomerangs they use. The Hopi have the strength of jaw and patience to chew a jack. Not many of us would bother. But the sight of a jack vaulting over the prairie in 12- to 20-foot strides is compensation enough. And to bring a leaper down in mid-flight [*Continued on page* 209]

Learn the natural lore of the rabbit and you'll go home at night to a tasty stew.

Record Player

[*Continued from page* 141]

Use a spirit level to get turntable perfectly horizontal, placing shims under shock mounts.

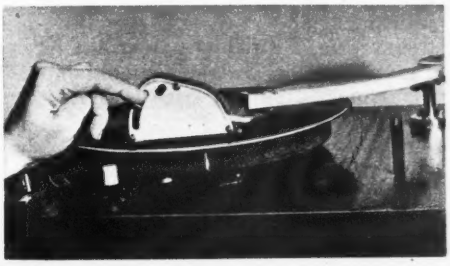
automatic changer arms are too short to track well enough for good fidelity. (A pickup arm tracks perfectly when the cartridge is always tangent to the record groove in which its stylus rides.)

Assembling your own manual record player allows you the opportunity to select components to suit your own taste. Many turntable units, pickup arms and cartridges are offered on the audio market and your judgment and purse are the only limitations in choosing the right combinations. The components of the player described here were chosen with quality of sound and moderate cost in mind. More expensive components could have been chosen, but one of the objectives of the project was to produce a high quality player for no more than the cost of a good automatic changer. The turntable and pickup arm selected adequately fill the bill.

The player utilizes a shock mounted four pole, shaded pole induction motor, with a single rim drive idler turning a heavy

[*Continued on page* 208]

A stylus pressure gauge will help you to get the pressure recommended by cartridge maker.



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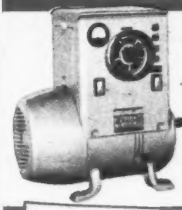

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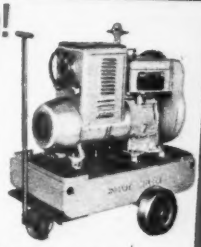
With the "Husky Boy" 200 amp. arc welder you can do profitable general shop and outside repair work; emergency service on pickup trucks—all on a low investment. It's compact and lightweight—easy to transport. For extra convenience when used inside, wheels and handles easily bolt to the unit, and are available at slight extra cost.



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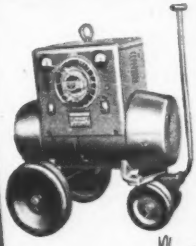

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Kedman Co., 233 So. 5th W., Salt Lake City

Record Player

[*Continued from page* 207]

pressed steel turntable at 78, 45, or 33⅓ rpm. Performance tests indicate accurate speeds and very little wow or rumble. The unit (General Industries Model DSS) incorporates features found in turntables of much higher cost. Furnished with the turntable are a 45 rpm spindle adapter and a speed indicator plate.

Pickup arms vary in price and performance but it is a far cry from the light plastic arm of the automatic player to one of the many well designed pickup arms on the market, such as the Livingston Universal arm used on this player. Any other fine arm such as the Pickering, Fairchild, Audax, or Gray can, of course, be used. We urge you to purchase a pickup arm and cartridge at the same time since mountings for cartridges have not all been standardized and mistakes may be avoided by matching the arm and cartridge at the time of purchase.

Construction of the player is clearly shown in the drawing. The outside veneer used should match the appearance of the rest of your furniture. The motor and turntable plate must be bolted directly and firmly to the veneered mounting base board. Special care should be given to following the manufacturer's instructions for mounting the pickup arm; a mounting template is usually supplied to assure correct positioning. Mount the arm after mounting the turntable. A toggle or rotating type on-off switch is mounted near the turntable speed indicator plate and placed in series with the turntable and 110-volt outlet cord. The pickup arm lead out wire and the 110-volt cord should be led from the unit apart from each other to prevent hum.

For best performance make sure that the turntable is perfectly horizontal, using a spirit level on the turntable and cardboard shims under the shock mounts. Level the pickup arm with the set screw adjustment on the vertical mounting post of the arm. Finally, adjust the stylus pressure to the cartridge manufacturer's recommended setting with a stylus pressure gauge. •

When answering advertisements please mention
MECHANIX ILLUSTRATED

[*Continued from page* 206]

with a single shot is a thrill rivaling the best Africa has to offer.

Those are the rabbits of America—the cottontail, the swamp rabbit, and the snowshoe and jack, the last two of which are hares. Wherever you live, you can put yourself within eyesight or gunshot of one of these blurs of fur. Bringing them to bag is another matter.

The population of rabbits is cyclic. They show an almost superhuman dedication to the future of their race, and their numbers will build to an awful, cluttered climax in any region they inhabit. Then disease usually sets in—tularemia, the rabbit fever, to decimate the clan.

An entire cycle usually takes about ten years. Thus, the man who says, "We had *rabbit* hunting when I was a boy, but now it's awful," may need only to wait four or five years to experience renewed plenty.

How far will an area of peak population extend? It may encompass whole counties or states that have been spared tough winters, so that forage remains plentiful. Or a population may build to peak in the "back 40" that Uncle Judd has let lie for a few years.

The natural lore of rabbits should be of interest and use to their pursuers. To score, you must know the rabbit you are after—his feeding and wandering habits and where he'll head when he's jumped. Most of all, you must know the locality you are hunting—every rock and tree and thicket; the lay and the roll of the land. The more

[*Continued on page* 223]

BUILDWORDS CONTEST WINNERS
Will be announced in the December issue of MECHANIX ILLUSTRATED

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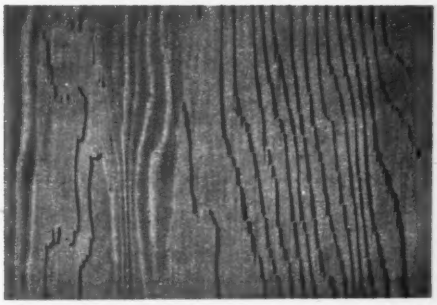

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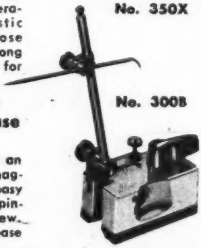

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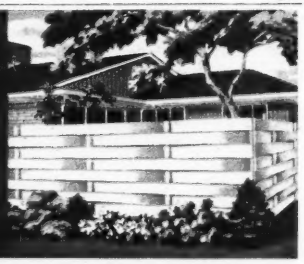

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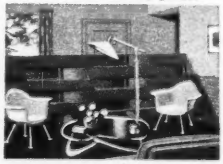

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Electronic Sentry

[*Continued from page* 144]

When the line voltage is applied to the AC plug, electrons will flow from the cathode to the plate of the tube, through R1 and the plate circuit relay, whenever the plate of the 117N7 tube is positive. The potentiometer, R1, is adjusted so that with the photo-tube removed the relay is just released. Now, by placing the photo-tube into its socket, and exposing it to a small amount of light, current is allowed to flow through the photo-tube in a direction that makes the grid of the amplifier tube become positive. This allows more current to flow through the amplifier tube and relay, energizing the relay and closing the control circuit contacts. •

PARTS LIST

	1	Box, 4x4x2-inch, Bud #CU883
	1	Vacuum Tube, RCA 117N7
R1	1	Potentiometer, 50K, ½ watt; Mallory #U35
R2	1	Resistor, 20 megohm, IRC
	1	Photo-Tube, RCA 868
	1	Relay 10K; Potter & Brumfield #LS5
C1	1	Capacitor, 12 mfd, 150 volt; Blue Beaver, BR1215
	2	Tube Sockets, Amphenol 4 prong & octal
	1	Line cord and plug
	1	AC chassis receptacle, Amphenol 61F1

Note: Total cost of parts is about $11.

Old Spain Youth's Chair

[*Continued from page* 127]

seat, and are half-notched where they cross. These are attached with glue and screws. The legs are shaped as shown and are mounted in the slots at the ends of these boards using a generous spread of glue. The legs must fit tightly in the slots. After the glue has dried two key nails are driven through each joint.

Now the chair is ready to be finished. All surplus glue is scraped off and the area sanded. Stain chair with light oak stain in oil and rub down thoroughly. Apply two coats of clear varnish, sanding lightly between coats. •

BILL OF MATERIALS

1—¾"x13"x16"	Oak or other hardwood Back
1—¾"x14"x15"	Oak or other hardwood Seat
4—¾"x3"x17"	Oak or other hardwood Legs
2—¾"x2½"x14½"	Oak or other hardwood "X" Boards
1—¾"x2"x8"	Oak or other hardwood Brace
10—No. 8 1¼"	flathead wood screws; glue; stain

Mail For McCahill

[*Continued from page* 196]

able qualities in 50,000 miles. Sure, they'll *run,* maybe 200,000 miles on a set of springs, but *how?* Replacement of shocks, springs and key parts of the front-end assembly should be made the moment they indicate inefficiency if any car is to be kept in top road condition.

● *I have power steering in my new De Soto and the front tires show a lot of wear even though I keep them well inflated and have less than 11,000 miles on the speedometer. Could the power steering cause this?*

Dave Halpern
New York City, N. Y.

Yes, power steering can wear tires out faster than conventional steering, especially the full-time type—and here's how. With full-time power steering it takes little or no effort to turn the wheels from lock-to-lock while standing absolutely still. I have noticed many people with this type of steering have developed a habit, when either parking or pulling out of a tight spot, of cutting the wheels fully from left to right before making a move. Naturally this is very rough on the tires. With old-fashioned type steering (dig that crazy old-fashioned), which I love so much, only Charlie Atlas or Strangler Lewis went in for full lock-to-lock standstill steering. The old method was to move the car a few inches forward or back, as this relieved the arm moxie required to turn a non-moving wheel. This jockeying back and forth in order to steer into a tight spot was much easier on tires.

● *Read Bill Parker's Workbench column this month in which he says you now have nine Labrador retrievers. How many ducks do you intend to shoot? As long as you like hunting so much, why don't you test guns for us the way you do automobiles? Nobody else does, or at least not the way you do.*

Ralph Newcombe
New Orleans, La.

Right now I only have five pups left and two adult hunting dogs. I'd like to test guns but I'm only allowed so much space

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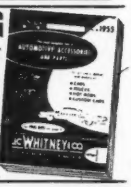

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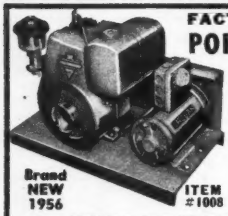

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in the magazine each month, so at this writing I can't test them. But here's a free idea for the shell companies which is long overdue. Every hunter has experienced, especially in duck shooting, getting his shells wet or damp, which removes either the markings on the case, telling what size shot the shell contains, or the paper disc off the end. I have a box of shells at home which contains everything from goose loads to quail loads and I have no way of knowing which is which. Why don't manufacturers make different colored shells to correspond with shot size? For example, red might mean 6; blue, 4; green, 2; etc. This would make it a lot simpler for the hunter who doesn't have an Abercrombie & Fitch mobile unit following him.

● *Late this fall I am going on an elk hunt in Utah. I am thinking about buying one of the new Jeeps for a hunting car. Do you know of anything better than a Jeep for this use?*

Peter Bailey
Minneapolis, Minn.

There is nothing better than a Jeep for this use. If you are going to camp out, there are several two-wheel trailers on the market that'll carry enought extra gear for a two-year safari. Incidentally, I have a gadget which I think is definitely worth recommending to all sportsmen and it fits in the toolbox of my Jeep like a dream. It's an aluminum-handled, two-edged, 10-inch saw, fine and coarse cut, housed in a leather sheath which also contains a top-grade hunting knife. The saw, which I have already used, not only cuts through sizable logs for firewood but can be used for cutting branches to toss under your wheels in case of a bog-down. It is also designed for cutting the largest animal bone, for hunters of such animals. The whole outfit, saw, knife, sheath and whetstone, weighs only 12½ ounces. If interested, write to: Knapp Hunting Kit, Elko, Nevada.

● *What do you do to make your car seats comfortable? I've tried everything in my new car—pillows, air tubes, rattan backs—but nothing seems to offer relief to my poor can. I'm driving to California this*

winter so hope you can help me with a solution.

Irv Winters
Irvington, N. J.

Being well-upholstered myself, I rarely have too much seat trouble. Occasionally, though, I find a seat too soft and sloppy, especially in hot weather. I tried out a brand-new idea recently which seemed pretty great and might help you. Frank Arpin, of Orange, N. J., a neighbor of yours, encased the foam rubber part of his Cadillac front seat in an air-proof vinyl bag. At one end of this bag he had a small tube which was connected to the vacuum side of his manifold. By turning a little valve under the dash, in 30 seconds or less all the air in the foam rubber was withdrawn which instantly made the seat as hard as a park bench. By opening the valve again, the seat took on air once more and became soft. With this simple installation, which is invisible under the seat covers, I was able to obtain any hardness of seat desired and hold it there in a matter of seconds. I understand Arpin is making this for the regular house mattress trade but I feel it has a place in automobiles for owners such as you.

- *I have a 1952 Ford Mainline Coach, and have been told that if I install dual exhausts it would increase the power by 15 or 20 hp. Is this so?*

M. L. Piper
Ontario, Canada

If your exhaust system is in original condition without leaks, installing dual exhausts should increase your horsepower but certainly not as much as 15 or 20 unless your present pipe is tied in a knot.

- *Perhaps you could explain why you put so much emphasis on "cornering ability."*

Luke R. Sinclair
Fort Dodge, Iowa

Cornering ability may mean that a guy will live a little longer when he accidentally, or otherwise, finds himself in a bend or curve at a higher-than-reasonable speed. It is also of prime importance in an emergency when you must swerve quickly to avoid hitting a child, another car or your bookmaker. Under stress emergency con-

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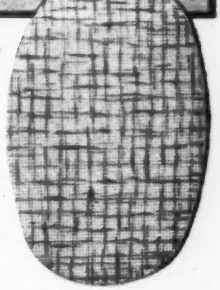

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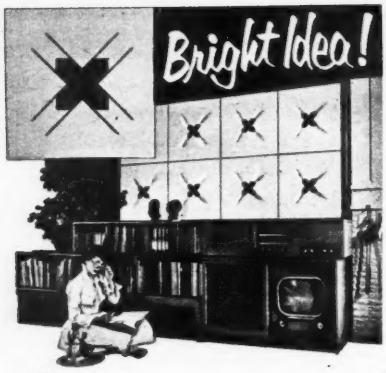

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ditions, which can occur at almost any speed and any time, the top cornering car will keep its feet and balance better, which means control, and this single factor can save your life.

● *If two cars are accelerating to 60 mph and one car does it in 11 seconds and the other car in 12 seconds, how far apart would they be?*

Jerry Burger
Albany, Ore.

There is no possible way to answer this accurately. In fact, it is quite possible, though not probable, that the car that takes 12 seconds 0-60 would be ahead of the car which did it in 11. I wrote this up about five years ago when I matched the MI Ford against my gearshift 1950 Cadillac 61. Both cars could do 0-60 in ten seconds flat but the Cadillac would be a good 50 feet ahead of the Ford when they both reached 60 mph. The gimmick was that the Cadillac, with its far higher torque, outjumped the Ford in the first five or six seconds. After that time, the Ford really started to unwind and build up speed equal to the Cadillac, to a point where they both touched the 60 mph mark in exactly 10 seconds—but the Cadillac was still way out in front. In other words, in a contest such as you suggest, the equation is: How *far* can a car *go* in so many seconds? Not how fast would they be going at the end of so many seconds? •

Meet The New MG

[*Continued from page* 89]

requested gas gauge is now provided. Speedometer, calibrated up to 110 mph, carries trip and total mileage recorders; the tachometer, calibrated up to 6,500 rpm, carries a yellow segment beginning at 5,500 and a red sector starting at 6,000.

Another dial groups together oil pressure gauge and water thermometer. The loudspeaker grille is in the center, with the horn button recessed below it; beneath the facia goes the control panel for the optional heater which picks up fresh air from behind the radiator grille. On the right is space for the radio control unit. On the extreme left is the switch for the flashing indicators and on the far right a shrouded lamp for map reading.

The big curved screen, swept by twin

electric wipers, is detachable, and braced by struts which form hand grips. A well-tailored top stows away behind the seats and in front of it lies a permanently attached leather cloth envelope with compartments for the two side screens. A new feature is the spring loaded signaling flap, which closes firmly to check rattle and draughts; perhaps a little too firmly for the average feminine wrist. Spare wheel, tool kit and screw jack stow in the trunk, leaving enough free space for a couple of good sized suitcases; an external luggage rack is an optional extra.

Under the hood is the B-type four-cylinder engine. It is similar in mechanical conception to that of the MG-TF but is a more modern unit, with slightly larger bore and with its carburetors and exhaust system on the opposite side. Maximum power is 68 bhp at 5,500 rpm against the 64 bhp at 5,000 rpm of the MG-TF 1500. Torque is practically unchanged but the peak on the new engine comes in at 500 rpm higher.

On the road the first impression is one of easy maneuverability. Despite the extra length, the light, quick steering and 28-foot turning circle allows it to thread its way through the traffic like a London taxi but when the lights turn green any resemblance to a taxi ceases forthwith. The clutch seems better than the old one in combining sweetness and light pedal action with an ability to withstand full throttle gear changes. An axle ratio of 4.3 to 1 against 4.875 for the MG-TF permits a marked reduction in engine revs for a given road speed, to match the reduction in wind resistance; at the same time, the gear box ratios are more widely spaced, so there is not much change in maximum speeds on the lower two gears—about 25 mph in first and 42 in second at 5,500 rpm but in third the car rushes up to 68 before the rev counter needle is too far into the amber and it takes well over 70 to put you in the red. Maximum speed? At the time of writing there wasn't time for a thorough test but the Le Mans cars, with engines giving 82 bhp, were given production axle ratios and full width windscreens in preparation for the Alpine Trial and with screen up and top down—the worst conditions for speed—they could be wound up to about 103-104 mph. One can therefore calculate that the stock model, with possibly more silencing,

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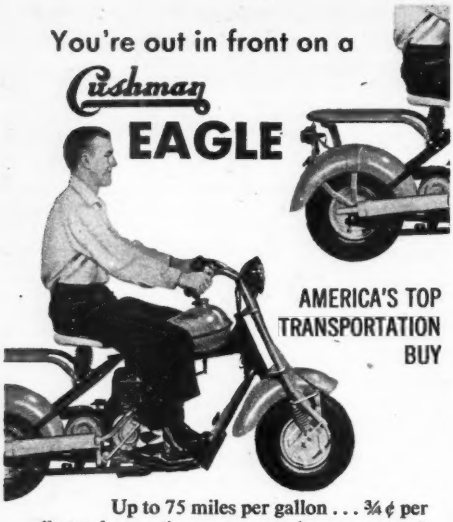

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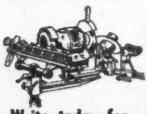

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should do between 90 and 95 mph, especially with top and side screens erected.

In selecting the axle ratio for a new model the designer has to compromise between higher speeds on the gears and a possible higher all-out speed on the one hand and better acceleration on the other. Despite the use of a "faster" axle on the MG-A, unofficial tests with early examples in unmodified stock form suggest that a representative figure for acceleration through the gears from 0 to 50 mph will be about 12 seconds and from 0 to 60 mph around 19 seconds. Other axle ratios, higher and lower, can be fitted at extra cost, to meet owners' demands.

Sports car owners are not primarily interested in fuel economy but the new low-drag bodywork combined with the lower numerical axle ratio should show useful economies at a given average speed. Drag reduction brings cumulative benefits; less power is expended in pushing the air aside, so engine revs can be reduced. This in turn means lower friction and pumping losses in the motor; less power spent thrashing the oil about; lower friction losses in the transmission. Tests with an MG-A running at a steady 30 mph have shown 38 miles per U. S. gallon. At 50 mph it does about 32 mpg and at a steady 70 mph, a creditable 23 mpg seems to be possible.

Cornering and general handling represent a big step forward. A center of gravity less than 16 inches from the ground is an inbuilt safety factor and with a well-tuned engine, advanced students will be able to demonstrate the four wheel drift. The oversteer, familiar on the MG-TF and MG-TD, has gone and the tail seems slower to break away. Hydraulic brakes, with ten-inch drums 1¾ inches wide, are the same size as those used at Le Mans.

For competition drivers, new tuning schedules are in preparation. Meanwhile, items like sodium filled exhaust valves with special guides, racing clutch, racing wheels with light alloy rims, 24-gallon gas tank and racing hood straps are available as extras.

Also on offer at extra cost are radio, heater, screen washer, white wall tires, adjustable telescopic steering column, choice of axle ratios, 5.90 section road speed tires, external mirror, radiator blind and cockpit cover.

There is some power roar from the disc type air cleaners at full throttle and the hand brake, still of the fly-off racing type, seems small and less accessible than that on the MG-TF. But after trying the MG-A, the fact remains that it is more than ever fun on four wheels at a price that the average fan can pay. •

SPECIFICATIONS

MODEL TESTED:
MG, Series MG-A

ENGINE:
4 cylinder, ohv; bore 2.875 inches, stroke 3.5 inches; maximum torque 77.4 foot pounds @ 3,500 rpm; brake horsepower 68 @ 5,500 rpm; compression ratio 8.15 to 1

DIMENSIONS:
Wheelbase 94 inches; overall length 156 inches; tread 47½ inches front, 48¾ rear; width 58 inches; height 50 inches; weight 1,990 pounds; standard tire size 5.60 x 15; gas tank 12 gals

PERFORMANCE
0 to 50 mph, 12 seconds
0 to 60 mph, 19 seconds
38 mpg at 30 mph; 32 mpg at 50 mph; 23 mpg at 70 mph
Top speed, 90-95 mph

Car Care

[*Continued from page* 91]

wagon. This should be varnished once a year.

For that new convertible the trade offers a "raincoat" which is easily put over the top to protect against heavy showers or soot from factory chimneys. You can drive the new car with the plastic raincoat on because it fits tightly and has a clear plastic back window. However, don't keep a "raincoat" on too long at one time because the top must be allowed air and sunlight to prevent mildew. Also wash or sponge off the plastic window of a convertible for dusting will scratch it. There are special polishes to remove scratches on plastic. Rag tops can be washed often with mild soap and water. They can also be brushed with a soft hat brush. Normally cleaning fluids should not be used on these tops but an exception is vinyl plastic which can be cleaned with foam cleaner if there are stubborn spots. An art gum eraser is effective for keeping tops clean inside as well as out.

Better get the car manufacturer's special instructions for keeping upholstery in prime condition if materials are special in any way or if you do not know what they are. Leather-type vinyl upholstery, for in-

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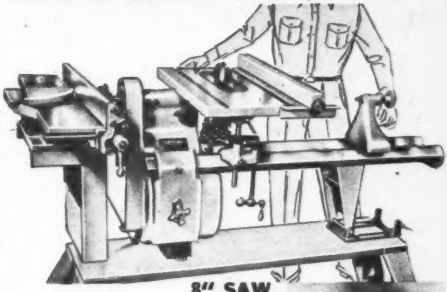

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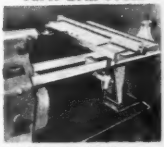

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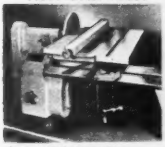

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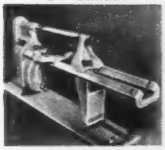

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stance, can be cleaned with lukewarm water and mild soap. Genuine leather is cleaned with a damp cloth and mild soap suds, immediately wiped off with another damp cloth. Follow with brisk buffing with clean cloth. Cleaning fluids should not be used on either of these materials.

To prevent breakage of car glass it's smart with new cars to leave the ventilating ducts open so that pressue cannot become damaging when a cold car is brought out into hot sunlight and allowed to stand with the windows closed. This will also help prevent a cracked window if doors are closed too quickly.

With any new car it is highly important to be able to spot need for adjustments. And it's smart to know what particular noises or oddities do not mean trouble. For instance, there's no need to be alarmed over a faint squealing noise when a power-aided steering wheel is cut all the way to right or left and the engine is being accelerated to move the car up a slight grade. This simply means that the pressure relief valve of the steering power pump is working normally. Pressure is being built up when it isn't needed.

The temptation to borrow trouble leads many of us to become over-conscious of noise which hints of rear-end gear irregularities. Often this is merely a tire noise and the tip-off is that this will vary for different kinds of road surfaces. Convertibles are going into the hands of many people who do not realize that in this type car you can hear rearward noises more plainly than in solid top models. Then there are the cracking sounds which are heard after the car is garaged. This is normal enough—merely heated metal of the exhaust system contracting.

Your nose can be a clue to need for checking. No reason to be alarmed because of that new car smell from paint on heated engine parts. But a definite smell of overheating, such as burning oil or rubber or vapors from alcohol anti-freeze or steam, should be good reason to pull over to the side of the road and do some investigating. Vapors from the exhaust on a cold morning, however, merely indicate condensation in the exhaust system. No cause for worry.

Many drivers are needlessly disturbed by up and down shifting of automatic

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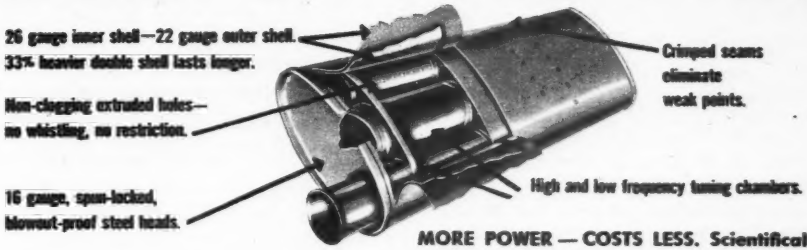

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transmissions. Whether or not these can be too easily felt may simply be a matter of how the driver handles the accelerator. Some automatics are partially controlled by throttle linkage which may need adjusting. Such adjustments are critical and should be done by an expert in the particular system. All the automatics are throttle-controlled indirectly, however. Here a little experience is required for best results. If gas mileage is poor the chances are that the driver is running too much in the lower gears, or in the case of torque converters that he isn't getting up to road speed quickly enough. This doesn't mean indulging in jack-rabbit starts but simply avoiding dragging action.

You can rock the car back and forth to get out of snow or mud with today's automatics. Just keep a light, steady pressure on the accelerator pedal as you move the selector lever back and forth between Reverse and Low. On a slippery road always use Drive for starting, never Low. Some automatics have a separate position on the selector lever for parking; others use Reverse for this purpose. Be careful not to go into Park or Reverse while the car is moving forward. And if the transmission makes a racket when you are trying to move it forward or backward this means that you haven't moved the selector lever completely to the correct position.

Cars with automatics can be pushed for an engine start. Get specific instructions for your car. But the chances are that the owner's manual will say to have the car pushed to about 20 mph in Neutral. Then move to Drive and switch on the ignition.

On some automatics you can use Low as an intermediate speed for better hill climbing or for better engine braking going down hill but only if the car is traveling 25 mph or over. Under this speed Low is strictly for slow climbing up a steep hill or for better control descending.

Any way you look at it, the dope on catering to the interest of your new car requires that you leave a lot of outmoded customs by the wayside. Let's not handicap the new car with the wrong kind of kindness or careless treatment.

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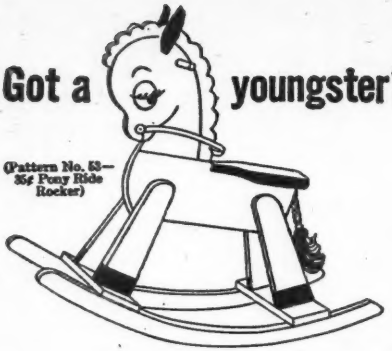
Got a youngster?



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Give him his own pony. No skill or experience needed to build this rocking horse with Easi-Bild* Patterns.

Just trace simplified pattern on wood, saw and assemble. Big decorating guide insures a professional-looking paint job.

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Easi-Bild Patterns specify PLASTIC WOOD for a real professional job. Handles like putty—hardens into wood.

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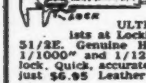

Electric Auto-Lite, 200 Amps, 24 Volt, 4400 RPM, Dandy arc welder. Wt. 53 lbs. Approx. GOVT cost $450. Like NEW. $12.50 incl. easy diagram.

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With 3 rods to measure all depths from 0 to 3 inches by thousandths. Hardened tool steel lead screw has full 1 inch run. Base is 2½" long, hardened ground and hand lapped. Accuracy guaranteed. Mfd. by Millers Falls Co. GOV'T COST approx. $30. NEW—$10.95 ppd. USA. In velvet case.

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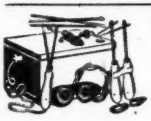

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The "Little Marvel" all-metal welder. 5-year written guarantee. Welds ⅛" metal or money back. Repairs tanks, tools, fenders, machine parts, etc. Complete with everything—rods, unit, eye shield, directions. $6.95 plus 50c postage. Flame torch accessory for soldering, cutting, brazing $3.95 complete with carbons, brass rods, flux. $2.00 deposit on C.O.D. ¼ inch Transformer Welder $21.95 F.O.B. ESSAY MFG. CO., Dept. 101, Quincy 69, Mass.

$6.95 Complete

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Will be announced in the December issue of MECHANIX ILLUSTRATED

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TEK PRODUCTS, 125 ILLINOIS ST., CENTRAL FALLS, R. I.

MI Classified Ads

begin on PAGE 38 this month

The '56 Ford

[*Continued from page* 95]

either by the calorie or shotgun method.

The 1956 Ford has the basic body shell of the 1955 car with some chrome juggling, new paint schemes and new upholstery patterns. Their big pitch this year is safety. To accomplish this they now offer a deep-center steering wheel which distributes the impact over the driver's chest and which also has a slow rate of collapse in the event that you contact a stone wall; new type door locks that won't fly open in a crash; optional seat belts, for both the front and back seats, which are anchored structurally to the car; crash cushioning for the sun visors and instrument panel, and rear-view mirrors with a special backing that prevents the glass from flying in case it gets shattered.

The roadability of all these new Fords is truly great, due to their ball-joint suspension, and they now have as extra equipment an air-conditioning unit located under the hood, which is where it should be. An odd twist, at this writing, is the fact that you can buy a Ford station wagon with air conditioning but you can't buy a Mercury wagon with it because the Mercury still uses a trunk conditioning unit.

While I'm still incidentalling, the 1956 Ford Thunderbird will have the outside tire mounting called "Continental" by Americans. The engine size of the new Thunderbird has been upped to 312 cubic inches from last year's 292. I haven't been given the horsepower or torque figures but I can tell you that this is the 1956 Mercury engine—and the 1956 Mercury, which I've already tested, is one of the hottest cars ever to emerge from Detroit.

All main units of the new Ford, from the transmission to axle, have been beefed up to accommodate the additional power. In fact, these jobs have been deluxed to such a point that you might have trouble finding a more deluxe American car.

These are truly great cars, the finest Fords ever built in Ford's long history. I heartily recommend them to anybody. Occasionally I am accused by an off-beat

[*Continued on page* 223]

Remington announces the world's first lightweight

AUTOLOADING BIG GAME RIFLE !

New Remington "Woodsmaster" Model 740 in powerful 30-06 caliber

*From $124.95**

Now—an autoloading big game rifle that handles the 30-06 cartridge—yet weighs as little as 7½ pounds! Sensational new Remington "Woodsmaster" Model 740 does it—and with the lightest recoil of *any* lightweight high-power sporting rifle. Exclusive POWER-MATIC action (gas-operated) balances and softens recoil—together with the non-recoiling barrel—lets you shoot faster, surer than ever before. Five shots on one loading . . . with extra magazines available to let you clip in 4 more rounds instantly. See the new Remington "Woodsmaster" Model 740 NOW—there's never been a gun like it!

Remington also offers the "world's strongest bolt action" in 8 big calibers—Models 721 and 722, from $82.80* and the world's fastest hand-operated big game rifle—slide-action Model 760 "Gamemaster," from $104.40.*

Remington DU PONT

FOR EXTRA STOPPING POWER, always shoot Remington big game ammunition. It's the only ammunition with famous "Core-Lokt" bullets and "Kleanbore" priming.

"Woodsmaster," "Gamemaster," "Core-Lokt" and "Kleanbore" are Reg. U. S. Pat. Off. by Remington Arms Company, Inc., Bridgeport 2, Conn.

*Prices subject to change without notice

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Item 24

Push Button Start—600-700 watts—115 v. 60 cyc. AC. Powered by a rugged 2 hp. easy starting Briggs gas engine. No wiring necessary, just plug in and operate. Plenty of current for any radio, television, oil burner, freezer, pump, lights, etc. which require up to 700 watts. Ideal for camp, cottage, trailer or boat! Includes voltmeter and built-in winding to charge 6 v. auto batteries. Wt. 75 lbs. Easily fits in car trunk. Be prepared if storm knocks out power lines. Reg. $275.00 ..... **$143.50**

1000-1200 Watt Plant (Item 45) same as Item 24 but with larger generator and engine—50% greater output. Factory Special **$199.50**

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(Item 10) Easily installed in furnace pipes. Forces even heat to all rooms. Over range removes kitchen smoke and odors. Powerful, continuous duty motor, 110-120 v. AC. Mount in wall or ceiling to ventilate any area. Quiet, super-efficient fan moves huge volume of air. (400 to 600 CFM).

8" Pipe, wt. 5 lb. $6.85
9" Pipe, wt. 6 lb. $7.85
10" Pipe, wt. 7 lb. $8.85
12" Pipe, wt. 8 lb. $9.85

HEAVY DUTY FAN. Semi-enclosed motor, suitable for spray booths, restaurant exhausts, poultry houses, etc.

10" Fan, wt. 8 lbs. (Item 10E) $11.95
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with mounting Range (Item 38)

Use as portable or shop welder. Up to 300 amps. Senior model. Made for years of trouble-free, continuous service. Will handle light or heavy jobs. Easily welds up to ¾" plate using ¼" rods. Built-in air cooling system. Arc is easy to strike and hold, because of specially designed arc stabilizer. Hi-do switch and dial control give wide range of welding heats. Run welder at 2600 rpm. with tractor, jeep or 14 hp. gas engine or 7 hp. elect. motor. Complete with instructions, guar. and triple V velt or flat pulley. You can pay more, but you can't buy a better welder. Wt. 110 lbs. $400 value at **$119.50**

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SUFFOLK SCIENCE SERVICE
DEPT. ATM-11 MATTITUCK, N. Y.

Telescope Maker's Page

[*Continued from page* 182]

lens removed) at prime focus of an astronomical telescope. The fixed diaphragm ratings of telescopes are easily computed by dividing the objective lens diameter into its focal length.

The moon's distance varies each month from 222,000 to 252,000 miles, or nearly 13%. It is obvious this causes an appreciable difference in the image size on film. Thus you should try to schedule your pictures when the moon is closest to the earth, at what is called *perigee*. Such data is to be found in most detailed almanacs, but they all obtain this information from the United States Naval Observatory's annual American Ephemeris. You can consult this book at any large public library.—*Peter Leavens* •

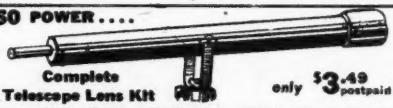
Golden Hammer Awards

[*Continued from page* 190]

CERTIFICATES OF MERIT have been awarded to the following:

Walter L. Jankot, Putnam, Conn. . . . Frank Allnutt, Cynthiana, Ky. . . . Leonard L. Bass, Washingtonville, N. Y. . . . Donald W. Dickie, Hazardville, Conn. . . . P. M. Hinson, Dry Branch, Ga. . . . . T/Sgt. Harold C. Gero, Grandview AFB, Mo. . . . Arthur J. Kunst, McKeesport, Pa. . . . Clarence A. Willott, Great Lakes, Ill. . . . Johnny Muller, Pipestone, Minn. . . . Dwane Lund, Gary, Ind. . . . C. J. Orvette, Derby, Conn. . . . Watch for the names of more winners next month. •

250 POWER . . . .



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Conquer Space, Explore the Universe, Planets, Moon Craters, New Stars, etc. Complete Lens Kit consists of 50 inch focal length ground and polished objective lens, eyepiece lenses for 50 POWER, 100 POWER, 150 POWER, 200 POWER, 250 POWER, and all necessary lens fittings. Easy to make from simple step by step instructions. (Tripod and mount not included.) Money back guarantee.

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The 3½" dia. reflector, astronomical telescope 100% American made. Completely mounted. Used by schools and universities for over 15 years. Unconditionally guaranteed. $29.75. Descriptive literature on request.

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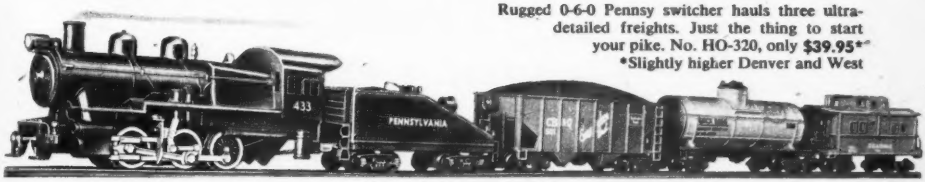
Rugged 0-6-0 Pennsy switcher hauls three ultra-detailed freights. Just the thing to start your pike. No. HO-320, only $39.95*
*Slightly higher Denver and West



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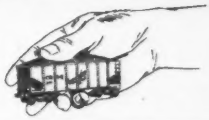

The A. C. Gilbert Company, Dept. G-11
New Haven 6, Connecticut
Please rush FREE Gilbert HO Catalog.

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The '56 Ford

[*Continued from page* 221]

reader of being on the Ford payroll because I've plugged them many times in the past. I sometimes wish this were true but, as it isn't, let me tell you why I've been in Ford's corner so often. Fords have always been quality cars at a low price. Bill France, the president of NASCAR, who in the course of a year sees thousands of cars pitted against each other in hundreds of races, said to me about a month ago when we were discussing the success of some other make cars: "Tom, the one thing you can't take away from Ford is that they have the best steel in the entire industry, regardless of price." He was referring to the fact that under the terrible beatings of stock car racing, Ford cars break fewer axles, wheels, frames and front-end assemblies than any other make. These are facts, not calculated fiction. •

When answering advertisements please mention MECHANIX ILLUSTRATED

Hunting And Fishing

[*Continued from page* 209]

you hunt an area, the better you'll do, unless you polish off all the occupants.

I remember a certain Connecticut briar patch, since ruined by the recent and catastrophic Northeastern flash floods. The briar patch was full of cottontails. It had a regular system of paths, entrances and exits, that any cottontail thicket will. Now rabbits are wisely most active during the twilight hours. In season, I'd go to this rabbity place when the light was failing and post myself by a fallen apple tree at the south end. I knew from times past I should be there to wait. Pretty soon one would come, skipping along in the dimness, oblivious to me. A misty target to be sure, but hard to miss when you're firing smack down his private sticker-lined highway.

Then wait, and a second might come by after the stinging din of the earlier blast had gone from its floppy, sensitive ears. Blam. Another bunny bites the dust.

So satisfying—the sport, and the rabbit stew! •

Picture yourself going places

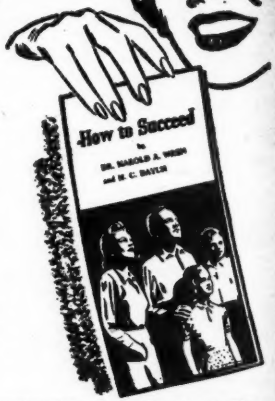
You've done it often. Call it day-dreaming if you like, but you've seen yourself in a bigger job — giving orders and making decisions — driving off in a smart new car — buying your family a fine home.

There's nothing wrong with dreams. But how about making them come true? *You can do it,* if you're willing to try!

Look around you. The men who are going places are the *trained* men. They've learned special skills that bring them better jobs and higher pay. It's the men *without* training whose dreams never come true.

What are you going to do about it? Just wait and wish? If you really *want to succeed,* you can get the training you need by studying at home in your spare time. International Correspondence Schools offer you a course in just about any field you choose, giving you the practical plus the bedrock facts and theory. No skimming or skimping! And you'll be earning while you learn. Students report better jobs and more pay within a few months.

Look over the list of subjects in the coupon below. Pick out the one that interests you most — the one that holds the greatest future for you. Then mark the coupon, and mail it today. *Find out* what I. C. S. can do for you. It costs only a stamp or postcard, but it's the first step if you want to go places!



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ain You AT HOME in Spare Time for Jobs in RADIO-TELEVISION

America's Fast-Growing Industry Offers You

1. EXTRA MONEY IN SPARE TIME

Keep your job while training at home. Many NRI students make $10, $15 a week extra fixing neighbors' sets in spare time, starting soon after enrolling. The day you enroll I start sending you special booklets that show you how to fix sets. You use the Multitester built with equipment I furnish to locate and correct set troubles. Adam Kramlik, Jr., Sumneytown, Pa., wrote: "Earned $12 to $15 a week, spare time. Now have my own Radio-TV shop."

2. GOOD PAY JOB

Radio-Television growth and expansion and new uses for known principles are making more jobs for well-trained men. There are over 3000 Radio Broadcasting Stations on the air giving good pay to operators, technicians. Over 115 million home and auto Radios are now in use, providing full time and spare time servicing opportunities. Government, Aviation, Police, Ship, Micro-wave Relay, Two-way Radio Communications for buses, taxis, trucks, railroads are growing fields of opportunity.

3. BRIGHT FUTURE

About 200 Television stations are now on the air from coast-to-coast. Hundreds more being built and hundreds of others authorized. These new stations will need operators, technicians. More than 25 million Television sets are already in use and require servicing. Thousands more Television sets are being sold every week and need installation, servicing. Act now to qualify for a good job or your own sales and service business. Cash in on this rapid growth.

Television is Making Good Jobs, Prosperity

Training plus opportunity is the PERFECT COMBINATION for job security, advancement. When times are good, the trained man makes the BETTER PAY, gets PROMOTED. When jobs are scarce, the trained man enjoys GREATER SECURITY. NRI training can help assure you and your family more of the better things of life. My training is practical, complete; is backed by 40 years of success training men at home. My well illustrated lessons give you basic principles you need and my skillfully developed kits of parts "bring to life" things you learn from the lessons.

Find Out What Radio-Television Offer You

Without obligating you in any way, I'll send an Actual Lesson to prove that training at home is practical. I'll send my 64-page book to show good job opportunities for you in Radio-Television, show equipment you build, show what my graduates are doing and earning. Terms for NRI training are as low as $5 a month. Many graduates make more in two weeks than the total cost of my training. Mail coupon now. J. E. SMITH, President, National Radio Institute, Dept. 5MC, Washington 9, D. C. OUR 40TH YEAR.

The Tested Way to Better Pay

Broadcasting with Parts I Send

ting Course I send you kits of parts to build the low-ansmitter shown at left. You use it to get practical erience putting a station "on the air," performing edures demanded of broadcasting station ators. An FCC Commercial Operator's nse can be your ticket to a better job and ight future. My Communications Course s you the training you need to get your se. Mail card and see in my book other able equipment you build.

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I TRAINED THESE MEN AT HOME FOR SUCCESS IN RADIO-TELEVISION

Now Has Own Shop. "Got laid off my machine shop job which was best thing that ever happened to me as I opened a full time Radio shop."—Ernest T. Slate, Corsicana, Texas.

First Job Thru NRI. "My first job was operator with KDLR obtained for me by your Graduate Service Dept. Now charge of Radio Equipment for Police and Fire Dept."—T. S. Norton, Hamilton, Ohio.

Radar Job plus Spare-Time Earnings. "I have a job working on radar equipment. Also do spare-time radio and TV servicing. Have my own amateur radio station W3PRN."—F. Zawake, Scranton, Pa.

Paid for Course Before Graduation. "By the time I graduated I had paid for my course, a car and testing equipment. Can service toughest jobs."—E. J. Streitenberger, New Boston, Ohio.

AVAILABLE TO VETERANS under G.I. BILLS

Want Your Own Business?

Many NRI trained men start their own business with capital earned in spare time. Let me show you how you can be your own boss. Joe Travers, a graduate of mine, in Asbury Park, N. J. writes: "I've come a long way in Radio and Television since graduating. Have my own business on Main Street."

CUT OUT ON DOTTED LINE

Mail this Card to Get 2 BOOKS FREE

The ABC's of SERVICING

ACTUAL LESSON

This card entitles you to actual lesson on Servicing. It will convince you that learning Radio-Television at home is easy, practical.

64 Pg. BOOK

MY DOUBLE OFFER also includes 64-page Book, "How to Be a Success in Radio-Television." You'll see what my graduates are doing, earning; see photos of equipment I send.

NO STAMP NECESSARY

MR. J. E. SMITH, President, Dept. 5MC
National Radio Institute, Washington 9, D. C.

Mail me Sample Lesson and 64-page Book, "How to Be a Success in Radio-Television"—Both FREE. (No salesman will call. Please write plainly.)

NAME.....AGE.....

ADDRESS.....

CITY.....ZONE.....STATE.....

VETS write in date of discharge.....

SEE OTHER SIDE

Be a Success as a RADIO-TELEVISION Technician

See Inside

NRI Training Can Lead to Jobs Like These in Radio-Television

BROADCASTING: Chief Technician, Chief Operator, Power Monitor, Recording Operator, Remote Control Operator. SERVICING: Home and Auto Radios, P.A. Systems, Television Receivers, Electronic Controls, FM Radios. IN RADIO PLANTS: Design Assistant, Service Manager, Tester, Serviceman. SHIP AND HARBOR RADIO: Chief Operator, Radiotelephone Operator. GOVERNMENT RADIO: Operator in Army, Navy, Marine Corps, Forestry Service Dispatcher. AVIATION RADIO: Transmitter Technician, Receiver Technician.

Read What NRI Graduates Say

Owner of Appliance Store "I own a third of the Grantsville Appliance Co. in my home town with a branch in Spencer, W. Va. Things look very good for the future."—B. Siers, Grantsville, W. Va.

$10 to $15 Week Spare Time. "Four months after enrolling, was able to service radios—averaged $10 to $15 week spare time. Now have full time business." — Wm. Weyde, Brooklyn, N. Y.

Works on TV Color. "My position with WNBT is video control engineer. I owe a lot of my success to your textbooks."—Warren Deem, Malverne, N. Y.

Chief Technician. "Within a year I opened my own full-time radio shop. NRI training qualified me as Instructor during war. Now Chief Radio and TV Serviceman."—P. G. Brogan, Louisville, Ky.

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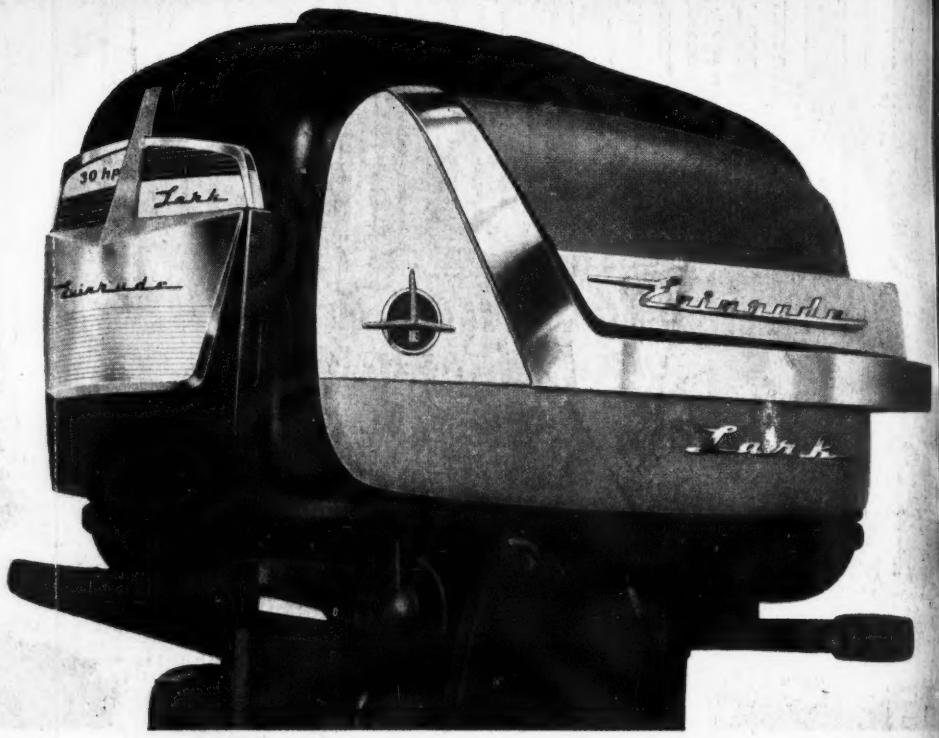

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